STATEMENT OF BASIS

For

Phibro-Tech, Inc.
A.K.A. Southern California Chemical
A.K.A. Entech Recovery, Inc.
8851 Dice Road
Santa Fe Springs, California
CAD008488025

California Environmental Protection Agency
Department of Toxic Substances Control
Region 3

U.S. Environmental Protection Agency
Region 9

November 9, 1994

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LIST OF ATTACHMENTS

1. INTRODUCTION

This Statement of Basis (SB) explains the proposed remedy for addressing soil and ground water contamination at the Phibro-Tech, Inc. (a.k.a. Southern California Chemical, a.k.a. Entech Recovery, Inc.) facility in Santa Fe Springs, California (see site location map in Attachment 1). The facility produces a variety of inorganic chemicals, including copper compounds and specialty products used in the aerospace and electronics industries. The facility also stores and treats off-site generated hazardous waste from these industries. An approximate facility layout is shown on the map in Attachment 2.

The California Environmental Protection Agency, Department of Toxic Substances Control, Region 3 (Department) with technical support from the U.S. Environmental Protection Agency, Region 9 (U.S. EPA) is conducting the remedy selection process for Phibro-Tech, Inc. (PTI).

This SB explains the proposed remedy and the rationale for selecting the proposed remedy. It contains a summary of background information provided by PTI including investigation findings, potential human health impacts, and the cleanup options that were considered in the remedy selection process. The summarized information can be found in greater detail in the key technical documents prepared by PTI for this facility. These key documents, which are listed in Attachment 11, can be found in the Los Nietos Library which is located at 11644 E. Slauson Ave. in Whittier, California or at the Santa Fe Springs City Library which is located at 11700 Telegraph Road, Santa Fe Springs, California. The complete Administrative Record, which includes the key technical documents, data and other pertinent correspondence, can be found at the Department office located at 1011 N. Grandview Avenue in Glendale, California. A large majority of the documents in the Administrative Record use the previous facility name, Southern California Chemical.

This SB is organized into the following sections: Introduction, Public Participation, The Problem - Ground Water and Soil Contamination, Proposed Remedy, Facility Background, Environmental Setting, Scope of the RCRA Facility Investigation, Ground Water Remediation, Soil Remediation, Glossary and Attachments. All tables and figures referenced in these sections appear in the Attachments section at the end of this document.

2. PUBLIC PARTICIPATION

The Department solicits public comments from any party, including the company, other regulatory agencies, and members of the public, on the cleanup options considered and the proposed remedies for soil and ground water contamination at this site. Public comments can be submitted to the Department in writing during the public comment period from November 13, 1994 through December 30, 1994, or in person (orally or in writing) at a public meeting/hearing to be held on December 13, 1994 at 7:00 p.m.

Comments should be postmarked by December 30, 1994 and sent to:

Liang Chiang
California Environmental Protection Agency
Department of Toxic Substances Control, Region 3
1011 N. Grandview Avenue
Glendale, California 91201

A final remedy for the facility will be selected by the Department only after the public comment period has ended and the information submitted during this time has been reviewed and considered. Modification may be made to the proposed remedy or another remedy selected based on new information or public comments.

All comments received will be reviewed and responded to before a final remedy selection is made by the Department. Anyone who comments on the proposal will receive notice of the final decision.

The Department is initiating a permit modification to incorporate the selected remedy into PTI's existing State Hazardous Waste Management Facility Permit (State Hazardous Waste Permit No. 91-3-TS-002). This modified state permit will supersede the Federal Resource Conservation and Recovery Act Permit issued to the facility on July 29, 1991. The remedy selection process is consistent with Section 25200.10 of the California Health and Safety Code (H&SC) which requires that any permits issued by the Department include corrective action for all releases of hazardous waste or hazardous constituents from a solid waste management unit or a hazardous waste management unit at a facility.

The Department and U.S. EPA also encourage the public to contact either agency with any questions concerning the proposed remedy or the alternatives considered. Liang Chiang of the Department or Ron Leach of U.S. EPA can be contacted with questions concerning the proposed remedy at (818) 551-2964 or (415) 744-2031, respectively.

3. THE PROBLEM - GROUND WATER AND SOIL CONTAMINATION

Ground water in the present uppermost saturated zone beneath the facility, identified by PTI as the Hollydale Aquifer, contains elevated levels of: (1) heavy metals, including chromium and cadmium, (2) halogenated volatile organic compounds (VOC's), including trichloroethene (TCE) and 1,2,-dichloroethane (1,2-DCA), (3) aromatic VOC's, including benzene, toluene, ethylbenzene and xylenes, and (4) chlorides.

Although the shallow ground water in the Hollydale Aquifer is not now being directly used as a source of drinking water, it has potential beneficial uses which are impaired by this contamination. The Hollydale Aquifer may also be in hydraulic contact with the next lower water zone, called the Jefferson Aquifer, which is currently used as a source of drinking water.

Soils at the facility contain elevated levels of (1) heavy metals, including lead, cadmium, chromium, copper, and zinc, (2) halogenated VOC's, including TCE, 1,2-DCA and tetra-chloroethene (PCE), (3) aromatic VOC's, including benzene, toluene, ethylbenzene and xylenes, (4) polychlorinated biphenyls (PCB's), (5) petroleum hydrocarbons, including diesel fuel, gasoline and unidentified heavy hydrocarbons (possibly crude oil) and (6) chlorides. A presently unsaturated zone, identified by PTI as the Gage Aquifer, is affected by site-derived soil contaminants. Upon re-saturation, water in the Gage Aquifer would be impacted from the site-derived soil contaminants. The Gage Aquifer, which extends from approximately 15 feet to 35 feet below ground surface, is saturated elsewhere in the area (e.g., Angeles Chemical Company).

It is the determination of the Department that PTI is responsible for, at a minimum, cadmium, chromium and portions of the VOC contaminants found in the ground water beneath the facility. Therefore, containment, monitoring and/or remediation of site soils is necessary to prevent further threat to ground water and remediation of ground water is necessary to prevent potential spread of contamination downgradient or to underlying aquifer units.

4. PROPOSED REMEDY

Proposed remedies for addressing both ground water and soil contamination are described in the following sections.

A. Ground Water

The proposed remedy is to pump and treat contaminated ground water from the Hollydale Aquifer, monitor ground water in the Hollydale and Jefferson Aquifers and monitor the Gage Aquifer for the presence of ground water. Key elements of the proposed remedy are summarized below.

- Pumping of contaminated ground water from the Hollydale Aquifer.
- Removal of halogenated and aromatic VOC's, predominantly TCE, from extracted ground water via carbon adsorption treatment system at the well head.
- Storage of extracted and VOC-treated ground water in newly constructed tanks.
- Use of all extracted ground water for on-site industrial processes (e.g., washing copper oxide compounds).
- Removal of cadmium and chromium from the extracted ground water via chemical precipitation treatment system.
- Discharge of treated ground water into sewer system in accordance with Los Angeles County Sanitation District requirements.
- Quarterly monitoring of the Hollydale Aquifer to determine ground water quality, track contaminant migration and identify new releases should they occur.
- Installation of additional monitoring wells into the Gage Aquifer as needed to assure the earliest possible indication of ground water resaturation.
- Monthly gauging of the Gage Aquifer for the presence of ground water during the rainy season (December to April) and quarterly for the remainder of the year (July and October).

- Installation of at least one appropriately positioned monitoring well into the Jefferson Aquifer to assure that the Jefferson Aquifer is not being impacted by elevated concentrations of site-derived cadmium, chromium and halogenated VOC's from the Hollydale Aquifer.

- Quarterly monitoring of Jefferson Aquifer well(s) for a minimum of one year to determine facility impact on ground water.

B. Soils

The proposed remedy for soils includes a general remedy for all soil contaminants, a specific remedy for hydrocarbon contamination in the former underground fuel storage tank (UST) area and a specific remedy for halogenated VOC contamination (e.g., TCE).

Active remediation, such as excavation, is not being proposed for the cadmium, chromium, copper, lead, nickel, zinc, PCB and heavy hydrocarbon contamination in the shallow soils at the facility. When properly capped, monitored and use-restricted as required by the general soil remedy discussed below, these contaminants are constrained at the site and would not pose an imminent threat to human health and/or the environment. The Department retains its authority to require additional investigation and cleanup should new information or further evaluation indicate that these site-derived contaminants pose a threat to human health and/or the environment.

Proposed General Remedy for All Soil Contaminants: The proposed general remedy includes containment measures, deed restrictions, vadose zone monitoring, revision of the existing facility closure plan and surface water monitoring. Each of these elements are summarized below.

- <u>Containment Measures - Paving and Run-off Control.</u> Pave all areas of the facility that are not currently paved. Identify and reconstruct all damaged paved areas, including secondary containment areas and sumps. Develop a formal inspection and maintenance program for the full site cover (pavement, secondary containment, sumps, etc.). Evaluate and revise the existing site drainage system to contain run-off and to prevent infiltration of liquids into subsurface soils. Construct berms around the facility perimeter to contain rainwater run-off and chemical spills.

- <u>Deed Restrictions</u> - Record a deed restriction notice with the County of Los Angeles. Unless the property owner can adequately demonstrate otherwise to the Department, the following restrictions would apply: (1) prohibits facility property from being used for residential or other sensitive purposes, (2) prohibits using underlying shallow ground water for domestic use, (3) requires full paving for any commercial or industrial uses, (4) requires minimization of any below grade earth moving activities, (5) requires prior notice and agency approval before removing any soils from the property and (6) requires the property owner to maintain site cover (paving) in a manner that prevents infiltration of liquids into subsurface soils. The deed restriction applies to the property and is not impacted by any ownership changes.

- <u>Vadose Zone Monitoring</u> - Install monitoring devices into unsaturated soils to provide early detection of contaminant migration from all active sumps, all active clarifiers, Pond 1, Pond 2, filter press, the sewer outlet connection area, and any other subsurface units that are designed to accumulate rainfall. These units all actively manage process or waste water and thus pose a higher threat to leak and cause migration of existing contaminants through the subsurface soil. Early detection of contaminant migration is important so that the leaking unit may be quickly replaced or repaired before it can mobilize residual soil contamination and impact ground water. Vadose monitoring is also needed to assess the ability of the facility cover element of the corrective action to prevent infiltration into the subsurface. This section is called vadose monitoring because devices will be installed into the "vadose zone" which is defined as the unsaturated region between the land surface and the water table.

- <u>Modification of Facility Closure Plan</u> - The April 1990 Closure Plan, which is referenced in the facility operating permit, describes the process for closing the facility after industrial operations have stopped. It is proposed that the closure plan be revised to specify that (1) the facility will be fully paved after final closure and (2) the final site cover shall be constructed to prevent accumulation of water on-site and infiltration into subsurface soils.

- Surface Water Monitoring - Sample and analyze surface water run-off from the facility to determine contaminant concentrations. Surface water monitoring is required for the facility under the October 15, 1992 Amended General Industrial Activities Storm Water Permit issued by the Los Angeles Regional Water Quality Control Board. As required by the Permit, PTI has implemented a surface water sampling program at the facility. The Department has determined that the existing sampling program is not adequate because it does not include a sufficient number of monitoring points, does not analyze samples for key facility contaminants such as cadmium, total chromium and hexavalent chromium, and does not adequately compare the analytical results to the applicable storm water contaminant standards. The Department is proposing that this existing surface water sampling program be expanded to include additional parameters and sampling locations, and that PTI submit a revised surface water monitoring plan to the Department for evaluation and approval.

Specific Remedy for Former Underground Fuel Storage Tank Area: In-situ bioventing is proposed to remediate aromatic VOC and hydrocarbon releases from the former UST system. It consists of introducing air and possibly nutrients into the contaminated soils in order to promote biological growth which will act to degrade hydrocarbon contamination. The gasoline and diesel fuel released into the soils will be degraded because they are used as a food source by the microorganisms. The proposed remedy for the former UST system includes the following elements:

- Construction and operation of an in-situ bioventing system which will likely include installation of wells.

- Establishment of a monitoring network to evaluate effectiveness through measurement of fixed and biogenic gases (e.g., oxygen, carbon dioxide and methane).

Specific Remedy for Halogenated VOC Contaminated Soils: The proposed remedy includes a soil vapor survey and possible installation and operation of a soil vapor extraction system. The proposed remedy consists of the following elements:

- A soil vapor survey to fully define the nature and extent of halogenated VOC contamination. It is proposed that the soil vapor survey be initially focused in the halogenated VOC remediation area shown on Attachment 9. The establishment of the halogenated VOC remediation area is tentative since it is based on existing soil matrix data. Although the soil matrix data is a good indicator of a halogenated VOC problem, it is not generally representative of the full extent of contamination. The Department may reduce or expand the halogenated VOC remediation area depending on the findings from the soil vapor survey.

- Depending on the findings of the soil vapor survey, the Department may require PTI to construct and operate an in-situ soil vapor extraction system to remove halogenated VOC's, predominantly TCE, from soils. The in-situ soil vapor extraction system would include installation of wells into the unsaturated zone to monitor and extract vapor phase halogenated VOC's, such as TCE, from subsurface soils. VOC's tend to partition or "evaporate" from free liquid, dissolved phase or from adsorbed compounds into a gaseous phase in subsurface soils. By extracting the soil vapor, the VOC's are eventually removed from subsurface soils. The soil vapor extraction (SVE) system, if required, will operate in the unsaturated zone above the ground water table.

- Installation of air moving equipment (e.g., blower)

- Installation of air treatment system (e.g., carbon canister)

C. Closure of Pond 1

In addition to the proposed remedy for soil and ground water contamination discussed in this section, the Department has required PTI to implement the approved Modified Closure/Post Closure Plan for Pond 1 (see Attachment 14). The Modified Closure/Post Closure Plan, which was approved by the Department in September 1988, requires the relocation of two wastewater treatment tanks currently located in Pond 1, the excavation and proper disposal of the concrete lining and underlying contaminated soil and the installation of an interim and final cover over the Pond 1 area. Full implementation of the Modified Closure/Post Closure Plan was delayed pending the completion of the facility investigation. Since the facility investigation has now been completed, the approved Modified Closure/Post Closure Plan for Pond

1 must now be implemented. The schedule included in the Modified Closure/Post Closure Plan was keyed to the September 1988 approval date and is now obsolete. To address this concern, the Department has required that PTI submit a revised implementation schedule for the Modified Closure/Post Closure Plan.

5. FACILITY BACKGROUND

A. Operations History

The PTI facility is located at 8851 Dice Road in Santa Fe Springs, California (Los Angeles County). The PTI facility occupies approximately 4.8 acres and is located in a primarily industrial area of Santa Fe Springs (see site location map in Attachment 1). The facility is mostly paved and is surrounded by other industrial facilities with the closest residential areas being approximately 800 feet to the northwest. Past uses of the property include a railroad switching station and foundry casting facility (1950's). There has been chemical manufacturing on this site since approximately 1957. Presently, PTI is a division of CP Chemicals, Inc., a New Jersey corporation.

PTI produces a variety of inorganic chemicals, including copper compounds and specialty products used in the aerospace and electronics industries. The specialty products include etchants, solder strippers, brighteners and conditioners. Other products include copper oxide, copper sulfate and ferric chloride. The facility also stores and treats off-site generated hazardous waste from the aerospace and electronics industries.

PTI treats and recycles a variety of inorganic hazardous wastes. These wastes, which are primarily generated in the electronics and aerospace industries, contain copper, chromium, iron, tin, lead, nickel, sulfates, chlorides, hydroxides and ammonium bifluoride. The wastes are treated through precipitation/neutralization to generate new products for sale, wastewaters and metal-containing sludges. Process units include settling tanks, holding tanks, wastewater treatment tanks, filter presses, multistage clarifiers, process and storm drain sumps, drum storage areas and drum and truck washing areas. PTI discharges treated aqueous wastes to the sanitary sewer pursuant to a permit from the Los Angeles County Sanitation District. Sludges generated by the facility are transported to a heavy metal smelter for recycling.

B. Regulatory History

In 1985, as requested by the Los Angeles Regional Water Quality Control Board and California Department of Health Services, PTI installed 7 wells and began ground water monitoring at the facility. Sampling of these wells confirmed the presence of cadmium, chromium, aromatic VOC's and halogenated VOC's in the ground water. Further investigation, including the installation of 6 additional monitoring wells, was conducted to better define the extent of soil and ground water contamination.

In 1985, PTI installed a ground water extraction well (EX-1) and removed a limited amount of contaminated ground water during preliminary testing of the well.

In 1987, U.S. EPA contractors conducted a RCRA Facility Assessment (RFA) of the site. The RFA was conducted to identify areas where the potential for chemical releases was significant. Identified areas included regulated units (e.g., Pond 1), solid waste management units (SWMU's) and areas of concern where hazardous materials were used or stored.

In September 1988, the Department and U.S. EPA modified and approved a closure/post closure plan for Pond 1 at the facility. The approved closure plan specified some interim closure actions and indicated that closure activities in general were to be conducted in concert with the December 1988 consent agreement between U.S. EPA and the facility.

In December of 1988, U.S. EPA and PTI signed a consent agreement (Administrative Order on Consent, Docket No. RCRA-09-89-0001). The consent agreement required PTI to conduct a RCRA Facility Investigation (RFI), Corrective Measures Study (CMS) and Pre-Investigation Evaluation of Corrective Measures (PIECM). The purpose of the RFI was to characterize the nature and extent of soil and ground water contamination at the facility. The purpose of the CMS was to identify and evaluate remedial alternatives to address the contamination. The purpose of the PIECM was to identify corrective measure technologies potentially applicable to the PTI site and potential data needs for the RFI.

In July 1989, PTI removed two 10,000 gallon underground fuel storage tanks (gasoline and diesel). A release of fuel hydrocarbons from the tank system to subsurface soils was documented. The Los Angeles County Department of Public Works (LADPW) is the local agency responsible for addressing hydrocarbon releases from underground fuel storage tank (UST) system. U.S. EPA, LADPW and PTI agreed that the UST area investigation would be incorporated into the existing RFI.

RFI field work and draft report development took place in two phases between 1990 and 1992. In July 1991, PTI received similar federal (RCRA) and state permits to treat and store hazardous waste. The permits were issued to Entech Recovery Inc., a.k.a. Southern California Chemical (State Hazardous Waste Permit No. 91-3-TS-002).

In September 1991, U.S. EPA required that PTI conduct a risk assessment to evaluate potential impacts to human health from the soil and ground water contamination. On August 2, 1993, U.S. EPA approved the April 23, 1993 RCRA Facility Risk Assessment Report for the facility.

PTI has kept U.S. EPA and the Department informed of all corrective action activities consistent with the requirements of the consent order. U.S. EPA has evaluated all workplans and reports and conducted audits of key field work activities at the facility. Currently, PTI samples selected monitoring wells on a quarterly basis and prepares reports that document the analytical results.

6. ENVIRONMENTAL SETTING

A. Geology and Hydrogeology

Soils under the facility are stream and flood plain deposits consisting of interbedded silts and sands with some clayey sequences. Although ground water is now encountered first at a depth of approximately 52 feet below ground surface (bgs) in the Hollydale Aquifer (see drawing in Attachment 8), it is overlain by the currently unsaturated Gage Aquifer and an intermediate low permeability zone. The Hollydale Aquifer is approximately 30 to 40 feet thick and is considered a "leaky" confined aquifer. Ground water flow direction in the Hollydale Aquifer is toward the south-southwest. No definite vertical gradients were determined from this site. Although the Hollydale Aquifer is separated from the deeper Jefferson Aquifer (water supply) by a low permeability clay zone of unknown variable thickness, this zone was not continuous across the site (not found in southwest corner, MW-15D). This suggests that the Hollydale and Jefferson Aquifers may be in direct contact at this location.

B. Surface Water

Drainages in the area direct surface water toward the San Gabriel River, which is located one mile west of the PTI facility. Locally, the PTI facility drains into an east-west trending drainage ditch which is adjacent to the southern boundary of the site and north of the Southern Pacific Transportation Company (SPTCo) railroad tracks. This drainage ditch is connected by two culverts under the SPTCo tracks to the "unnamed" drainage ditch which is also east-west trending but south of the SPTCo tracks. Although run-off occurs from certain areas of the facility (e.g, office areas), PTI contends that surface drainage from its process areas are now captured in sumps, re-used, treated on-site and discharged into the municipal sewer system.

The "unnamed" drainage ditch originates west of Norwalk Boulevard and receives stormwater run-off from parcels both north and south of the PTI facility. From the unnamed ditch, local drainage is discharged into Sorenson Avenue Drain which is approximately 0.25 miles east of the facility. This drain feeds into La Cañada Leffingwell Creek which flows into other creeks and eventually into the San Gabriel River.

C. Ecology

The limited ecology of the site is controlled by the semi-arid climate and its location within the fully developed industrial area of Santa Fe Springs. There is little vegetation near the facility because railroad tracks immediately border the site to the south, west and north.

7. SCOPE OF THE RCRA FACILITY INVESTIGATION

The RFI was required by the 1988 consent agreement between U.S. EPA and PTI. RFI field work and draft report development took place in two phases between 1990 and 1992. U.S. EPA representatives observed some of the field work and took samples of ground water for separate analysis. PTI prepared an RFI Phase 1 Report, RFI Phase 2 Report and an RFI Executive Summary Report. All of the RFI reports are key documents that are available for public review. The RFI Phase 1 and Phase 2 Reports will be referred to in this SB as the "RFI Reports."

The RFI included the following activities:

- Laboratory analysis of soil samples from all former and current SWMU's (ponds, sumps, drum storage areas, etc.), three off-site areas, and one off-site background location. The off-site areas included the drainage ditch adjacent to the southern boundary of the facility, the "unnamed" drainage ditch south of the railroad tracks and the area west of the laboratory (west parking lot). The off-site background location was in an empty lot across the street from the facility.

- Installation of 11 new ground water monitoring wells.

- Laboratory analysis of ground water samples from 23 wells (11 new, 12 existing) during three sampling rounds. Sixteen monitoring wells and one extraction well take water from the upper Hollydale (50-70 ft. depth) while seven monitoring wells take water from the lower Hollydale (80-90 ft depth). All the facility monitoring wells are shown on the map in <u>Attachment 10</u>.

- An aquifer pump test to better define the subsurface flow conditions.

- Laboratory analysis of surface water drainage at the facility (during rainfall event).

- Laboratory analysis of sludge samples from the site.

- Analytical parameters for soils and ground water typically included cadmium, total and hexavalent chromium, copper, iron, nickel, lead, zinc, pH and VOC's (ground water only). In addition, the investigation also included an expanded analytical program for selected soil and ground water locations. The expanded analytical program included heavy metals, mercury, cyanide, PCB's, semivolatile compounds, VOC's, total petroleum hydrocarbons and pH.

8. GROUND WATER REMEDIATION

A. Proposed Remedy for Contaminated Ground Water

<u>The remedy consists of two main elements</u>: (1) pumping of contaminated ground water to reduce cadmium, chromium and halogenated VOC concentrations, particularly TCE, in the Hollydale Aquifer and (2) monitoring the Gage, Hollydale and Jefferson Aquifers. The monitoring component includes the installation of new wells into the unsaturated Gage Aquifer and deeper Jefferson Aquifer.

The first element requires PTI to pump contaminated ground water from the Hollydale Aquifer, use carbon adsorption to treat extracted ground water at the wellhead to remove VOC's, store the ground water in new tanks, use all extracted ground water for on-site industrial purposes, treat the ground water in an on-site system to remove cadmium and chromium, and finally discharge the treated ground water into the sewer system in accordance with the requirements of the Los Angeles County Sanitation District (LACSD). The LACSD requirements include, but are not limited to, effluent discharge limits specified in the industrial wastewater discharge permit for the facility. The current industrial wastewater discharge permit includes effluent discharge limits for a variety of compounds including chromium (2770 $\mu g/l$), cadmium (690 $\mu g/l$) and volatile total toxic organics (e.g., TCE, benzene, toluene, ethylbenzene, xylene, etc.)(1000 $\mu g/l$). PTI will be required to contact the LACSD to determine if a modification to the existing industrial wastewater discharge permit will be necessary to operate the ground water remediation system.

The exact locations where ground water will be extracted from the Hollydale Aquifer will be specified in the corrective action ground water remediation workplan. This allows PTI flexibility in designing a ground water remediation system that will be better able to meet the cleanup standards. New storage tanks will be constructed and used to store the pumped ground water. The stored ground water will be removed from the tanks and used for industrial processes at the facility. The ground water will be treated to remove VOC's prior to any on-site use. The ground water will be treated to remove heavy metals before being discharged to the sewer system.

The second element requires PTI to (1) prepare a proposal for installing additional monitoring wells into the unsaturated Gage Aquifer and deeper Jefferson Aquifer and (2) prepare a comprehensive plan that documents how ground water in the Hollydale and Jefferson Aquifers will be monitored and how the unsaturated Gage Aquifer will be monitored for the presence of ground water. The monitoring plan will, at a minimum, specify which wells will be sampled, field procedures, analytical test methods, data analysis procedures, and contingency measures to address special situations such as re-saturation of the Gage Aquifer. The proposal for installing additional monitoring wells and the comprehensive monitoring plan will be submitted to the Department for review and approval before being implemented at the facility.

B. Source, Extent and Impact of Ground Water Contamination

Chromium, cadmium, toluene, ethylbenzene, xylenes, TCE and 1,2-DCA have been consistently detected in the Hollydale Aquifer above the Maximum Contaminant Levels (MCL's) for drinking water since monitoring at the facility first began in 1985. Although not analyzed in each sampling round, chlorides have also been detected at concentrations above the secondary MCL. Attachment 3 is a table that compares contaminant concentrations to the MCL's.

Ground water contaminants in the Hollydale Aquifer are grouped into the following three generic contaminant distributions: (1) cadmium and chromium, (2) halogenated VOC's (e.g, TCE, 1,2-DCA) and (3) benzene, ethylbenzene, toluene, xylene (BTEX). Each contaminant distribution and potential source areas for the contamination are discussed below. The contaminant distributions for cadmium/chromium, halogenated VOC's and BTEX are shown on the map in Attachment 4.

Cadmium & Chromium Distribution: The highest concentrations of cadmium and chromium in the ground water have been detected in well MW-4. For example, in the October 1993 quarterly sampling round, cadmium was detected in MW-4 at 710 $\mu g/l$ and chromium was detected at 80,300 $\mu g/l$. Monitoring well MW-14S was located so as to be immediately downgradient of well MW-4. Although cadmium and chromium have been detected in well MW-14S in the past, these compounds have not been detected above MCL's during the past few quarters.

As shown on the graphs in Attachments 5 and 6, chromium concentration data from MW-4 exhibit an overall decrease. At the same time, cadmium concentrations in MW-4 display an overall upward trend. Existing ground water monitoring data have been interpreted by PTI to mean that cadmium and chromium are not migrating off-site or into deeper zones of the Hollydale Aquifer in concentrations above the MCL's at this time.

The Department and U.S. EPA have concluded that the cadmium, chromium and portions of the VOC contamination originated from the PTI facility. Specifically, ground water and soils data suggest that Ponds 1 and 2 contributed to the cadmium, chromium and halogenated VOC contamination in the Hollydale Aquifer. This conclusion is based on the following information: (1) lack of a low permeability clayey zone immediately under Ponds 1 and 2 to intercept releases, (2) an historical rise in ground water levels under Ponds 1 and 2 which could suggest that wastewater from the units reached the ground water and (3) elevated contaminant concentrations in ground water immediately downgradient of Ponds 1 and 2.

The Gage Aquifer is described in the RFI Reports as existing in the interval from approximately 15 to 35 feet bgs. Although the Gage Aquifer is currently unsaturated at the PTI facility, it is saturated elsewhere in the area (e.g., Angeles Chemical Company).

PTI indicates in the RFI Reports that a low permeability clayey zone was not identified above the Gage Aquifer in the vicinity of Ponds 1 and 2 (SWMU's 4 and 6). The RFI Reports suggest that the clayey layer may have been removed during construction of Ponds 1 and 2. The Department has concluded that without the clayey zone present, it is possible for any wastes released from Ponds 1 and 2 to migrate directly into the Gage Aquifer. Once in the unsaturated Gage Aquifer, it is possible that any released wastes would eventually reach and then migrate down-dip along the low permeability clayey zone reported to exist between the Gage and Hollydale aquifers. Any imperfections, cracks or discontinuities in the clayey zone could then cause the released wastes to migrate further downward and impact the ground water (Hollydale Aquifer).

Data from 1985 through 1987 and the January 1989 quarter show that ground water elevations in the Hollydale Aquifer increased beneath Ponds 1 and 2 as compared to the rest of the facility. This ground water "high" is reported by PTI in the document, "Environmental Assessment, Southern California Chemical Company, Inc., Santa Fe Springs, California", March 1986, prepared by J.H. Kleinfelder & Associates, and in quarterly reports from approximately 1985 through 1987 and January 1989. The ground water "high" coincides with the location of Ponds 1 and 2 and with the elevated concentrations of cadmium, chromium, and halogenated VOC compounds detected in the ground water at monitoring well MW-4.

Monitoring wells MW-4, MW-8, MW-9, and MW-10 are interior wells that surround Ponds 1 and 2. Monitoring well MW-4 is located immediately downgradient of the ponds. Elevated concentrations of cadmium, chromium, VOC compounds and chlorides have been detected in the ground water at these wells. PTI indicates in the RFI Reports that chromium-and chloride-containing wastewater was contained in Ponds 1 and 2. Although generally stating that the VOC's come from off-site, PTI indicates in the RFI Reports that "...organics at surface or near the ground may be reflective of trace amounts of solvents in the waste water which was treated in Pond 1 in the past." The RFI describes a detailed investigation wherein three soil borings were placed through the interior of Pond 1 and an additional four soil borings placed at exterior locations. Only soil samples from boring PI-01 were analyzed for halogenated VOC's, aromatic VOC's, cyanides, PCBs, mercury, arsenic, pH and heavy metals. Soil samples from the other five borings were analyzed for pH and heavy metals. The following maximum contaminant concentrations were reported for soil samples taken from borings in the Pond 1 area:

Constituents	Maximum Concentration	
Arsenic	72	mg/kg
Cadmium	24.2	mg/kg
Hexavalent Chromium	199	mg/kg
Total Chromium	37,000	mg/kg
Copper	17,400	mg/kg
Nickel	652	mg/kg
Lead	4,200	mg/kg
Zinc	21,100	mg/kg
Mercury	350	µg/kg
Cyanide	830	µg/kg
PCB	1,100	µg/kg
1,1-Dichloroethane (1,1-DCA)	8	µg/kg
Trichloroethene (TCE)	6	µg/kg
Acetone	60	µg/kg
Methylene Chloride	26	µg/kg
Ethylbenzene	60	µg/kg
Toluene	1,300	µg/kg
Total Xylenes	410	µg/kg

The "RCRA Facility Risk Assessment Report, Southern California Chemical, Santa Fe Springs, April 23, 1993", prepared by PTI, was evaluated and approved by U.S. EPA on August 2, 1993. This report discusses the possible human health risks from soil and ground water contamination at the facility. The risk assessment includes a qualitative discussion of existing ground water contamination, contaminant migration, computer ground water modeling and ground water use in the area. It contends that the cadmium and chromium have not migrated off-site above MCL's and concludes that there are currently no ground water receptors (wells) within 1-mile downgradient of the facility (see drawings in Attachments 7 and 8). The Department does not fully agree with the findings of the risk assessment due to concerns over the ground water modeling and placement of monitoring wells. For more details on the risk assessment, please see the complete report which is a key document available for public review.

Halogenated VOC Distribution: The halogenated VOC compounds detected in the Hollydale Aquifer beneath the PTI facility include PCE, TCE, 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethane (1,2-DCA), trans-1,2-dichloroethene (1,2-DCE), carbon tetrachloride, 1,1,1-trichloroethane (1,1,1-TCA), chloroform and methylene chloride. The key halogenated VOC contaminant detected in the ground water most often is TCE. Ground water data suggests that there is a general increase in TCE concentrations demonstrated by comparing data from upgradient perimeter well MW-1S to data from downgradient perimeter well MW-7 (see table below).

Although TCE appears in ground water consistently across the site, interior wells MW-4 and MW-9 exhibit levels which are typically about 10 times higher than concentrations from upgradient perimeter well MW-1S (see table below). Monitoring wells MW-4 and MW-9 are located adjacent to Ponds 1 and 2. In addition to the TCE, 1,2-DCA has been detected in monitoring wells which surround Ponds 1 and 2 (e.g., wells 4, 8, 9 and 10). Elevated concentrations of halogenated VOC's, including TCE and 1,2-DCA, have been detected in soils immediately upgradient of wells MW-4 and MW-9 (see Attachment 9). Specific locations where halogenated VOC's were detected are documented in the soils section of this SB and include soil boring SB-7 and SWMU 20. The Department has concluded that halogenated VOC's, principally TCE, have been released into the facility soils upgradient of wells MW-4 and MW-9 and that this soil contamination is one of the on-site sources for TCE and other halogenated VOC's detected in the ground water.

Ground water data from the upgradient monitoring wells located in the deeper Hollydale Aquifer suggest that some halogenated VOC's may also be migrating onto the PTI facility from off-site sources in the area.

TCE concentrations ($\mu g/l$) in wells MW-1S, MW-7, MW-4 and MW-9 from January 1992 to July 1994 are as follows:

	MW-1S	MW-7	MW-4	MW-9
1/92	13	120	ND 250	45
4/92	9.9	55	280	52
7/92	10	53	280	ND 1,000
10/92	11	98	230	ND 1,000
1/93	9.2	73	ND 250	ND 100
4/93	5.7	23	25	110
7/93	11	43	100	1,100
10/93	14	44	290	390
1/94	9.3	53	130	230
4/94	14	96	190	270
7/94	7.9	140	340	200

ND - Not detected at specified concentration.

In addition to the wells surrounding Ponds 1 and 2, 1,2-DCA has been consistently detected in wells MW-7 and MW-16 which are located downgradient of the former UST area. 1,2 DCA has not been detected at elevated levels in upgradient perimeter well MW-1S. 1,2-DCA is not part of the degradation sequences for PCE, TCE or 1,1,1-TCA, but is a known gasoline additive that could have been released from the former UST area.

Aromatic VOC Distribution: The historical on-site distribution of benzene, toluene, ethylbenzene and xylene (BTEX) in ground water is defined spatially by wells MW-3, MW-4, MW-9, MW-11 and MW-16. In the RFI Reports, PTI indicates that these compounds probably migrated on-site from the northwestern facility boundary (1989 - 1991) and then moved toward the center of the facility (1992 - 1993). Ground water data from 1994 show that BTEX compounds are concentrated in interior wells MW-4 and MW-9 which are located near Ponds 1 and 2. To support the on-site migration theory, the RFI Reports document a BTEX compound release from underground tanks at a facility located to the north of PTI and reference ground water monitoring results from perimeter PTI wells (e.g., MW-3) showing on-site migration of BTEX contaminants.

The Department has concluded that there could be both on-site and off-site sources for the BTEX contamination. This conclusion is based on the PTI rationale discussed above and on the following information: (1) Ground water flow directions during the period of suspected on-site BTEX migration were southwest or parallel to the property line, <u>not</u> towards the interior of the PTI facility. Dissolved BTEX compounds would thus have had to move cross-gradient in order to reach the interior of the PTI facility, (2) BTEX compounds have been detected in soils at various locations throughout the PTI facility, (3) BTEX concentrations in certain interior wells increased during a time of rapidly rising ground water which suggests the presence of BTEX contamination in subsurface soils, (4) The former waste clarifier was located adjacent to well MW-3. Since no soil samples in the vicinity of MW-3 were analyzed for BTEX compounds, it is not known whether the former clarifier released contaminants which could have influenced ground water samples from well MW-3, and (5) PTI has not reported the presence of any free product layers in the ground water that could have migrated cross-gradient against the southwestern flow direction and directly onto the PTI facility.

<u>Chloride Distribution:</u> Elevated concentrations of chloride have been detected in a number of on-site wells. Since the facility uses and produces compounds containing chloride, the relationship is of interest. During the January 1991 quarterly sampling round, the highest chloride concentrations were detected in wells MW-1S (606 mg/l), MW-4 (812 mg/l), MW-7 (629 mg/l) and MW-14S (698 mg/l). These chloride concentrations exceed the secondary MCL of 250 mg/l. Comparison of chloride concentrations in paired wells such as MW-1S and MW-1D, MW-4 and MW-4A and MW-14S and MW-14D reveal that chloride concentrations in the shallow wells (e.g., MW-1S, MW-4 and MW-14S) are approximately 6 to 10 times higher than the deeper wells. For example, in January 1991, chloride concentrations in shallow well MW-4 were 812 mg/l while concentrations in the paired deep well MW-4A were 127 mg/l. The Department concludes that, at a minimum, chloride-containing compounds have been released from the facility and have impacted the upper zone of the Hollydale Aquifer.

C. Cleanup Standards for Ground Water

The cleanup standards discussed below were selected because the State of California considers the Hollydale Aquifer as a potential source of drinking water. Although the Hollydale Aquifer is not currently used for drinking water purposes, it is not saline, clearly retains future beneficial uses and may be in direct contact with other deeper saturated zones that are currently used to supply drinking water (e.g., Jefferson Aquifer).

State Water Resources Control Board Resolution 88-63, entitled "Sources of Drinking Water Policy", states that all waters of the State (with a few exceptions) should be considered as sources, or potential sources of drinking water, and should be protected as such. Moreover, the Los Angeles Regional Water Quality Control Board (LARWQCB), Region 4, Basin Plan designates in its Basin Plan that all aquifers in the Santa Fe Springs area as municipal supply (MUN). The U.S. EPA Region 9 Ground Water Policy supports California's position because it considers all ground water with Total Dissolved Solids (TDS) levels below 10,000 mg/l as potential underground sources of drinking water. There is currently no evidence to suggest that the Hollydale aquifer has TDS levels greater than 10,000 mg/l. It should be noted that PTI has itself contributed to TDS levels in the Hollydale Aquifer as shown by the high concentration of chlorides that have historically appeared in the ground water beneath the facility.

The California State Water Resources Control Board (SWRCB) has adopted an "Antidegradation Policy" as set forth in its Resolution 68-16, entitled "Statement of Policy with Respect to Maintaining High Quality of Water in California", which requires that water quality necessary to protect present and future beneficial uses be maintained. As described in its Basin Plan, the LARWQCB typically prescribes cleanup goals based on background concentrations. For cases where dischargers can demonstrate that cleanup goals cannot be achieved due to technological and economic limitations, State Board Resolution No. 92-49, entitled "Policies and Procedures for Investigation and Cleanup of Discharges Under Water Code Section 13304" indicates that a Regional Board may, on a case-by-case basis, set cleanup goals as close to background as technologically and economically feasible. However, such goals must, at a minimum, (1) restore and protect all designated beneficial uses of the waters, (2) cannot result in water quality less than that prescribed in the Basin

Plan and policies and procedures adopted by the State and Regional Board, and (3) must be consistent with maximum benefit to the people of the State. Note that the MCL is the legally permissible concentration of a contaminant allowed in water distributed to the public for drinking purposes not a level to which discharges are arbitrarily allowed. State Water Resources Control Board Resolution 68-16 (Non Degradation Policy) typically requires remediation of a site's specific contribution to ground water contamination.

The proposed establishment of wells MW-4 and MW-9 as compliance points, well MW-1S as an upgradient background monitoring point, and the cleanup standards as discussed below is based on existing information. The Department may establish additional points of compliance, cleanup standards and/or upgradient monitoring points for any facility derived contaminants if future data indicates that the MCL's for drinking water have been exceeded.

1. Proposed Cleanup Standards for Well MW-4

The proposed cleanup standards for ground water in monitoring well MW-4 are listed below. To demonstrate that the standards have been achieved, PTI must provide the Department with a minimum of four consecutive quarters of data below the standards.

Cadmium:	Less than 5 $\mu g/l$
Total Chromium:	Less than 50 $\mu g/l$
Hexavalent Chromium:	Less than 50 $\mu g/l$

Halogenated Volatile Organic Compounds (VOC's):

Tetrachloroethene (PCE):	Less than	5	$\mu g/l$
Trichloroethene (TCE):	Less than	5	$\mu g/l$
1,1-Dichloroethene (1,1-DCE):	Less than	6	$\mu g/l$
1,1-Dichloroethane (1,1-DCA):	Less than	5	$\mu g/l$
1,2-Dichloroethane (1,2-DCA):	Less than	0.5	$\mu g/l$
trans-1,2-Dichloroethene (1,2-DCE):	Less than	10	$\mu g/l$
Carbon Tetrachloride:	Less than	0.5	$\mu g/l$
1,1,1-Trichloroethane (1,1,1-TCA):	Less than	200	$\mu g/l$
Methylene Chloride:	Less than	5	$\mu g/l$

or

Four consecutive quarters of data from monitoring well MW-4 that are statistically at or below the corresponding halogenated VOC compound concentration observed in monitoring well MW-1S or a suitable replacement well as approved by the Department.

2. **Proposed Cleanup Standards for Well MW-9**

The proposed cleanup standards for ground water in monitoring well MW-9 are listed below. To demonstrate that the standards have been achieved, PTI must provide the Department with a minimum of four consecutive quarters of data below the standards.

<u>Halogenated Volatile Organic Compounds (VOC's)</u>:

Tetrachloroethene (PCE):	Less than	5	µg/l
Trichloroethene (TCE):	Less than	5	µg/l
1,1-Dichloroethene (1,1-DCE):	Less than	6	µg/l
1,1-Dichloroethane (1,1-DCA):	Less than	5	µg/l
1,2-Dichloroethane (1,2-DCA):	Less than	0.5	µg/l
trans-1,2-Dichloroethene (1,2-DCE):	Less than	10	µg/l
Carbon Tetrachloride:	Less than	0.5	µg/l
1,1,1-Trichloroethane (1,1,1-TCA):	Less than	200	µg/l
Methylene Chloride:	Less than	5	µg/l

<u>or</u>

Four consecutive quarters of data from monitoring well MW-9 that are statistically at or below the corresponding halogenated VOC compound concentration observed in monitoring well MW-1S or a suitable replacement well as approved by the Department.

3. **Rationale for Selection of Proposed Ground Water Cleanup Standards**

The proposed ground water cleanup standards for cadmium, total chromium and hexavalent chromium are the MCL's for drinking water. The MCL is the legally permissible level of a contaminant allowed in drinking water. There are both Federal and State of California MCL's available for cadmium and chromium. The more stringent MCL was selected for the cleanup standard.

The proposed ground water cleanup standards for the halogenated VOC's are set at background concentrations or below the respective MCL's for drinking water. PTI is responsible for addressing ground water contamination that originated from its facility. By setting the cleanup standards at background concentrations, PTI would be required to address the facility's own contribution to the ground water contamination. This option of the cleanup standard is based on statistically comparing contaminant concentrations in wells MW-4 and MW-9 to background levels as measured in well MW-1S or a suitable replacement well. The statistical comparison will determine PTI's contribution to the elevated halogenated VOC concentrations and thus how much must be cleaned-up. In certain circumstances, the background concentration may be below the analytical method detection limit. In lieu of requiring a cleanup to analytical method detection limits, the MCL's for drinking water are proposed as the second part of the cleanup standard.

The Department is concerned that well MW-1S may not be representative of background conditions due construction problems with the well and potential influences from a nearby SWMU. The Department will evaluate the existing monitoring network for the Hollydale Aquifer, including well MW-1S, and determine its adequacy when reviewing the comprehensive ground water monitoring plan. The Department may require that PTI replace certain wells and/or install additional monitoring wells at different depths and locations as necessary to protect human health and/or the environment.

4. Rationale for Not Proposing Ground Water Cleanup Standards for Aromatic VOC's

This action does not require a separate cleanup of all on-site aromatic VOC's (e.g, BTEX compounds) in the ground water for the following reasons: (1) the areas of highest aromatic VOC concentration in the Hollydale Aquifer (e.g., wells MW-4 and MW-9) will be addressed by the proposed remedy of pumping contaminated ground water from the Hollydale Aquifer; (2) ground water data from 1994 shows that aromatic VOC concentrations at other on-site wells, with one exception, are below the MCL for drinking water; and (3) it is not clear if all aromatic VOC contamination in the ground water originated from the PTI facility. The Department may require additional investigation and/or cleanup if future data indicates that there is a threat to human health and/or the environment.

5. **Rationale for Not Proposing Ground Water Cleanup Standards for Chlorides**

This action does not require a separate cleanup of all on-site chloride compounds in the ground water because chloride is not a hazardous waste or hazardous constituent. The proposed soil remedy includes elements to prevent future releases of chlorides into the ground water. The Department or other agencies such as the LARWQCB may require additional investigation and/or cleanup if future data indicates that there is a threat to human health and/or the environment.

D. **Development of Cleanup Options for Ground Water**

PTI prepared a Corrective Measures Study (CMS) Report that identified and evaluated remedial options to address ground water contamination at the facility. The Department considered the information and data contained in the CMS Report during the remedy selection process.

Cleanup alternatives were developed in two stages within the CMS report. During the first, a wide range of potentially applicable corrective action technologies were discussed and screened on the basis of the existing site characterization, waste-types and technology limitations. For example, excavation and on-site biological treatment of hydrocarbon-contaminated soils were described in the CMS as not being practical due to reported space limitations. This alternative was consequently screened from further consideration by PTI.

PTI next described remedial options based on technologies/methodologies that passed the screening process. Details of both the screening process and remedial option development are contained in the document, "Corrective Measures Study for CP Chemicals, Inc., Southern California Chemical, August 27, 1993." This document is available for public review as part of the Administrative Record.

Based on the screening process, the following cleanup options for ground water were developed:

Ground Water Option 1 - This option consists of ground water monitoring and reliance on natural attenuation to reduce contaminant concentrations. No active remediation is proposed. Ground water monitoring would include taking quarterly ground water samples for a period of 30 years from both upyand down-gradient wells at the facility. The ground water quality data would be used to provide a continuing characterization of contaminant migration and ground water quality.

A comprehensive ground water monitoring plan, encompassing both corrective action and facility operating permit requirements, was proposed as the mechanism to implement the monitoring program. The plan would specify all wells to be included, rationale for well selection, and sampling and analysis procedures. The plan would also include specific contingency steps to be taken if additional, unanticipated contamination was detected or if off-site migration of contaminants derived from the PTI facility were likely to occur. This plan would be submitted to the Department and U.S. EPA for approval prior to implementation.

Ground Water Option 2 - This option includes ground water monitoring from Option 1 plus institutional controls to restrict domestic use of the ground water on facility property.

Ground Water Option 3 - This option is comprised of the ground water monitoring from Option 1, institutional controls for restricting on-site domestic use from Option 2 plus pumping of ground water from well EX-1 (adjacent to MW-4). Extracted ground water would be stored in two newly constructed tanks on-site, used in various facility processes, treated in the existing wastewater treatment system to specifically remove cadmium and chromium, and discharged to the sewer system in accordance with an existing permit from the Los Angeles County Sanitation District.

Ground Water Option 4 - This option includes ground water monitoring from Option 1, institutional controls to restrict on-site domestic use from Option 2, ground water pumping with on-site industrial use from Option 3 and carbon adsorption treatment of the extracted ground water to remove VOC's, such as PCE, TCE, 1,2-DCA, BTEX and other related organic contaminants.

Ground Water Option 5 - This option includes ground water monitoring from Option 1, institutional controls restricting on-site domestic use from Option 2, pumping of ground water from well EX-1, and treatment with reinjection into the Hollydale Aquifer.

Extracted ground water would be treated to remove specific metals (e.g., cadmium, chromium) using chemical reduction and precipitation, followed by carbon adsorption to remove halogenated and aromatic VOC's. This treated water would then be injected into three newly constructed injection wells located along the upgradient perimeter of the PTI facility.

In addition to the five cleanup options considered in the CMS Report, the Department created a sixth option that consists of Option 4 plus extracting contaminated ground water from the Hollydale Aquifer and installation and operation of new monitoring wells in the Gage and Jefferson Aquifers.

Ground Water Option 6 - This option includes ground-water monitoring from Option 1, installation and operation of new monitoring wells in the Gage Aquifer to assure the earliest possible detection of ground water, installation and operation of at least one new monitoring well in the Jefferson Aquifer to assure that the ground water is not being impacted by site derived contaminants, institutional controls to restrict on-site domestic use from Option 2, pumping contaminated ground water from the Hollydale Aquifer, carbon adsorption treatment to remove halogenated and aromatic VOC's at the wellhead, on-site storage and industrial use of all extracted ground water, treatment to remove heavy metals such as cadmium and chromium and finally discharge of the ground water into the sewer system in accordance with a permit from the Los Angeles County Sanitation District. The total volume of extracted ground water may need to be adjusted such that the total discharge into the sewer system does not exceed limits set by the Los Angeles County Sanitation District.

The exact locations where ground water will be extracted from the Hollydale Aquifer will be specified in the corrective action ground water remediation workplan. This allows PTI flexibility in designing a ground water remediation system that will be better able to meet the cleanup standards.

E. Comparative Analysis of Ground Water Cleanup Options

Corrective action standards and remedy selection decision factors described below were used to evaluate the cleanup options for ground water.

The four corrective action standards are as follows:

1. Be protective of human health and the environment;

2. Attain media cleanup standards set by the Department;

3. Control the sources of releases so as to reduce or eliminate, to the extent practicable, further releases of hazardous wastes (including hazardous constituents) that may threaten human health and/or the environment; and

4. Comply with any applicable federal, state, and local standards for management of wastes.

The five remedy selection decision factors are as follows:

1. Long-Term Reliability and Effectiveness

    - Magnitude of residual risk
    - Adequacy and reliability of controls

2. Reduction of Toxicity, Mobility, or Volume of Wastes

    - Treatment process used and materials treated
    - Amount of hazardous materials destroyed or treated
    - Degree of expected reductions in toxicity, mobility, and/or volume
    - Degree to which treatment is irreversible
    - Type and quantity of residuals remaining after treatment

3. Short-term effectiveness

    - Protection of community during remedial actions
    - Protection of workers during remedial actions
    - Environmental impacts
    - Time until remedial action objectives are achieved

4. Implementability

    - Ability to construct and operate the technology
    - Reliability of the technology
    - Ease of undertaking additional corrective measures if necessary
    - Ability to monitor effectiveness of remedy

- Coordination with other agencies
- Availability of off-site treatment, storage and disposal services
- Availability of prospective technologies

5. Cost

- Capital costs
- Operating and maintenance costs
- Present worth costs

The following comparative analysis of the ground water cleanup options was done by using the four corrective action standards and five remedy selection decision factors.

1. <u>Protection of Human Health and Environment</u>

   Option 6 is considered the most protective of human health and the environment because it requires monitoring of the unsaturated Gage Aquifer for the presence of ground water, monitoring of the Hollydale Aquifer to track contaminant activity, monitoring of the Jefferson Aquifer to assure that this drinking water supply has not been impacted by facility contaminants, and extraction of contaminated ground water from the Hollydale Aquifer that will actively reduce the concentration of cadmium, chromium and halogenated VOC's (e.g., TCE) in the source area (MW-4 and MW-9). Reducing concentrations in the source area minimizes the potential for contaminant migration in the Hollydale Aquifer and future problems if site conditions change. Options 3, 4 and 5 are not as protective as Option 6 because they require ground water extraction from a single extraction well, have limited monitoring of the unsaturated Gage Aquifer (1 downgradient well) and require no monitoring of the Jefferson Aquifer. Options 1 and 2 are considered significantly less protective because they require just ground water monitoring of the Hollydale Aquifer and no active remediation.

2. <u>Attainment of Media Cleanup Standards</u>

   The Department has concluded that since Option 6 requires extracting contaminated ground water from the Hollydale Aquifer that it has the best chance of meeting the cleanup standards. Options 3, 4 and 5 require ground water pumping and treating from only the MW-4 area and are not considered as effective as

Option 6. Options 1 and 2 rely strictly on natural attenuation to reduce contaminant concentrations and are considered much less likely to succeed.

3. Controlling the Sources of Releases

The Department has concluded that since Option 6 requires extracting contaminated ground water from the Hollydale Aquifer that it provides the best potential to control migration of cadmium, chromium and halogenated VOC's from the source area. Options 3, 4, 5 and 6 all require ground water pumping which will be able to actively remove contaminant mass and control contaminant concentrations in the source area. However, Options 3, 4 and 5 are considered less effective because they require pumping from a single extraction well that may not encompass the full source area. Options 1 and 2 rely strictly on natural attenuation and are considered significantly less effective at controlling contaminant concentrations in the source area.

4. Compliance with Waste Management Standards

All cleanup options must meet applicable federal, state and local standards for management of wastes. This includes, but is not limited to, meeting sewer discharge requirements from the Los Angeles County Sanitation District.

5. Long-Term Reliability and Effectiveness

Option 6 provides the best overall long-term reliability and effectiveness. Effectiveness, as measured by the magnitude of residual risk remaining after treatment (see February 1991 EPA Guidance on RCRA Decision Documents), would be lowest in the long-run with Option 6 because masses of multiple contaminants would be permanently removed from the source area through pumping. Options 3, 4 and 5 may result in less mass removal because they require pumping from a single extraction well. Options 1 and 2 are not considered to have good long-term effectiveness because they rely upon undefined natural attenuation processes to reduce contaminant concentrations. Options 1, 2, 3, 4 and 6 provide good overall long-term reliability because they include technologies that are well tested and understood. Option 5 is considered less reliable because there may be certain technical and regulatory limitations with reinjecting ground water into the subsurface.

6. <u>Reduction of Toxicity, Mobility, or Volume of Wastes</u>

Option 6 provides the best overall reduction in toxicity, mobility or volume of wastes. Although Options 3, 4 and 5 also require pumping of contaminated ground water, they are limited to a single extraction well. Ground water pumping and treating permanently reduces the volume of cadmium, chromium and halogenated VOC's in the ground water. Pumping also actively limits the spread of the contaminants in the ground water. Options 1 and 2 are considered much less effective because they rely on natural attenuation instead of active pumping to reduce contaminant concentrations.

7. <u>Short-term effectiveness</u>

Option 6 is considered to have the best short-term effectiveness because it will actively remove more contaminants at a faster rate than the other options. Although all options may be protective of the community during operation of the corrective measure, progress toward restoring the beneficial use of the Hollydale Aquifer will be greatest with those options that require active pumping and treating.

8. <u>Implementability</u>

Options 1, 2, 3, 4 and 6 all have a good degree of implementability at the facility. Ground water monitoring in the Hollydale Aquifer, as required in all options, is currently being done at the facility. There is an existing extraction well and metals treatment system on-site that makes Option 3 easier to implement. Option 4 includes carbon treatment of water to remove organic compounds which is a well understood and tested technology. Option 6 includes the well understood and tested technology of installing and operating monitoring wells in the Gage and Jefferson Aquifers, and extracting contaminated ground water from the Hollydale Aquifer. Option 5 is considered to have a lower degree of implementability due to potential technical and regulatory problems that may be encountered with reinjecting ground water. For Options 3, 4 and 6, discharge volume for the treated ground water may be limited by regulatory agency requirements (e.g, Sanitation Districts of Los Angeles County or by National Pollution Discharge Elimination System Permit requirements).

9. Cost

Estimated costs for each clean-up option are presented below. These are based on the total present worth value taken directly from the CMS Report. The costs were estimated assuming 10 years of ground water pumping from well EX-1 and 30 years of ground water monitoring in the Hollydale Aquifer. The costs for Option 6 were estimated by taking the costs from Option 4 (CMS Report) and adding the costs of installing a new extraction well into the Hollydale Aquifer ($10,000), installing three new wells into the Gage Aquifer ($15,000) and installing one new well into the Jefferson Aquifer ($25,000).

Option	Action	Estimated Cost
1	Ground Water Monitoring	$832,100
2	Ground Water Monitoring Institutional Controls	$960,100
3	Ground Water Monitoring Institutional Controls Pumping Well EX-1 On-Site Use and Treatment Discharge to Sewer	$984,500
4	Ground Water Monitoring Institutional Controls Pumping Well EX-1 On-Site Use and Treatment Organics Removal Discharge to Sewer	$1,109,900
5	Ground Water Monitoring Institutional Controls Pumping Well EX-1 New Treatment (chemical reduction, precipitation and carbon adsorption) to Remove Metals and Organics Ground Water Reinjection	$2,047,000
6	Ground Water Monitoring New Wells in Gage Aquifer New Well in Jefferson Aquifer Institutional Controls Pumping Well EX-1 Pumping MW-9 or New Extraction Well VOC Treatment and Removal On-Site Use and Metals Removal Discharge to Sewer	$1,159,900

F. Rationale for Selection of Proposed Ground Water Remedy

The Department and U.S. EPA have concluded that the proposed remedy Option 6 best meets the corrective action standards and remedy selection factors. The proposed remedy is the most protective of human health and the environment, has the best potential to control migration of cadmium, chromium and halogenated VOC's (e.g., TCE) from the source area(s), is easiest to construct and will reduce the toxicity and volume of wastes.

PTI prefers Option 2, which includes ground water monitoring in the Hollydale Aquifer but no ground water extraction and treatment, for the following reasons:

a. PTI interpretation that ground water monitoring data indicates cadmium and chromium are not currently migrating off-site or into deeper zones of the Hollydale Aquifer above the MCL's.

b. PTI interpretation that chromium concentrations in well MW-4 show an overall downward trend.

c. PTI interpretation that there are currently no down-gradient ground water receptors (wells) within 1-mile of the facility.

d. Results from PTI mathematical model of ground water and contaminant flow that show off-site migration of metal contaminants is unlikely and that reduction in on-site concentrations will occur over time via natural attenuation. The Department and U.S. EPA do not agree with all of assumptions used in the PTI ground water model and the model's conclusions. PTI's ground water model is described in more detail in the CMS Report.

PTI's conclusions are partly based on ground water modeling which predicted limited or no migration of ground water contaminants. Predicting the fate and transport of ground water contaminants using a model has many uncertainties. These uncertainties, which include the model's assumptions, accuracy of input parameters, geologic heterogeneity and variability of sampling data, have a compounding effect that may reduce a model's accuracy. For example, the model PTI used at the facility was based on a historic downward trend in chromium concentrations. However, this downward trend is not a valid assumption for cadmium which has shown a generally increasing trend. The

Department has concluded that this model's level of accuracy as it is used at the facility is not sufficiently high to base decisions regarding human health and the environment.

The Department and U.S. EPA have concluded that the proposed remedy is the most protective of human health and the environment because it requires monitoring of the unsaturated Gage Aquifer for the presence of ground water, monitoring of the Hollydale Aquifer to track contaminant activity, monitoring of the Jefferson Aquifer to assure that this drinking water supply has not been impacted by facility derived contaminants, and extraction of contaminated ground water from the Hollydale Aquifer that will actively reduce the mass and concentration of cadmium, chromium and halogenated VOC's (e.g., TCE) in the source area (MW-4 and MW-9). Ground water underlying the site exhibits the greatest potential for future impacts to human health and the environment because it contains concentrations of cadmium, chromium and halogenated VOC's (e.g., TCE), that exceed the MCL's for drinking water. Ground water pumping has the potential to make greater progress toward restoring the beneficial uses of the Hollydale Aquifer than just the natural attenuation process.

The proposed remedy is also protective of human health and the environment because it minimizes the potential for contaminants to migrate from the contaminated Hollydale Aquifer into the underlying Jefferson Aquifer which is used as a drinking water supply. The constant discharge aquifer pump test conducted during the RCRA Facility Investigation was interpreted by PTI's consultant, Camp, Dresser, McKee Inc. (CDM), to indicate that there is some degree of communication between the Hollydale and Jefferson Aquifers. The December 6, 1992 Phase I RFI Report states, "Based on the analysis performed, the Hollydale Aquifer appears to be a leaky confined aquifer in the area beneath the PTI facility. The Hollydale Aquifer, therefore, may gain/lose water from/to the underlying Jefferson Aquifer". In addition, the clay aquitard separating the Hollydale and Jefferson Aquifers is missing from the stratigraphic column in borings logged near the southwest boundary of the facility. The December 6, 1992 Phase I RFI Report states, "Although silty material was noted at both 100 and 105 feet below ground surface in MW-15D, the amounts noted were not considered sufficient to indicate the continuation of the aquitard or similar lower boundary of the aquifer. This presents the possibility of exchange of water between the Hollydale Aquifer and the Jefferson Aquifer at this location."

The proposed remedy includes monitoring of the Jefferson Aquifer which is used directly as a drinking water source. There appears to be direct hydraulic continuity between the contaminated Hollydale Aquifer and the underlying Jefferson Aquifer. It is thus of cardinal importance that such threatened drinking water aquifers are monitored as carefully as possible. Monitoring within the overlaying Hollydale Aquifer alone is not sufficient because it does not provide direct information about the Jefferson Aquifer. The Department, in a June 23, 1993 Compliance Ground Water Monitoring Evaluation Report, identified some deficiencies in the ground water monitoring program at the facility. These included problems with the design and construction of certain ground water monitoring wells. Therefore, previous data may not have been fully representative of true ground water conditions. Moreover, ground water monitoring in general has some degree of uncertainty due to the heterogeneity of geologic materials. Monitoring of the Jefferson Aquifer is proposed to confirm that threatened drinking water supplies from the Jefferson Aquifer have not been impacted. Without such monitoring, site-derived contamination may not be detected until it reaches drinking water supply wells.

The proposed remedy provides the best potential to control migration of cadmium, chromium and halogenated VOC's from the source area(s). Pumping ground water from the Hollydale Aquifer will reduce the mass and concentration of the contaminants in the source area(s). This will act to limit migration and reduce future risks should site conditions change. Current ground water data suggest that site conditions have not been very predictable. For example, although chromium in well MW-4 does show an overall downward trend, cadmium concentrations show an overall upward trend. In addition, chromium and cadmium concentrations increased in well MW-4 during the July and October 1993 quarterly sampling rounds. The October 1993 quarterly sampling results showed that concentrations of total chromium in well MW-4 are approximately 1,600 times higher than the MCL for drinking water (see Attachment 3).

Historical site-specific extraction and monitoring data suggest that the proposed remedy which includes pumping from the Hollydale Aquifer will reduce the toxicity and volume of the wastes. In 1985, PTI installed extraction well EX-1 and removed a limited amount of contaminated ground water during preliminary testing of the well. Ground water monitoring data from this period show that chromium levels were lower after extraction well EX-1 was pumped.

Date	Activity	Total Chromium Concentration in Well MW-4 (µg/l)
2/85		500,000
7/85		550,000
?	EX-1 Pumping Starts	
3/86		61,000
5/86	EX-1 Pumping Stops	
7/86		120,000

To summarize, the proposed remedy includes institutional controls to restrict on-site domestic use of ground water from the Hollydale Aquifer, ground water monitoring of the Hollydale Aquifer, installation and operation of new monitoring wells in the unsaturated Gage Aquifer to assure the earliest possible detection of ground water, installation and operation of monitoring well(s) in the Jefferson Aquifer to assure that this drinking water supply is not being impacted by site-derived contaminants, ground water pumping from the Hollydale Aquifer, carbon adsorption treatment to remove halogenated and aromatic VOC's at the wellhead, on-site storage and industrial use of all extracted ground water, treatment to remove heavy metals such as cadmium and chromium, and finally discharge of the treated ground water into the sewer system in accordance with a permit from the Los Angeles County Sanitation District.

A comprehensive ground water monitoring plan will be developed to assure that further contaminant migration will be noted and appropriate response action taken. The ground water monitoring element of the proposed remedy is consistent with California regulations under Title 22, Sections 66264.90 through 66264.100. Ground water pumping in combination will the monitoring will both protect human health and the environment while also helping to restore the beneficial uses of the Hollydale Aquifer. This is consistent with California ground water policy which considers the Hollydale Aquifer as a potential source of drinking water that must be restored. The Department and U.S. EPA have concluded that the proposed remedy is both reasonable and prudent considering the site specific conditions.

9. SOIL REMEDIATION

A. Proposed Remedy for Contaminated Soils

The proposed soil remedy consists of six elements which include containment measures such as paving and berming to prevent direct human contact with soil contaminants, deed restrictions to limit future sensitive uses of the property, vadose zone monitoring for early detection of contaminant migration in soils, expansion of the existing surface water monitoring program, in-situ bioventing to cleanup soils in the former underground storage tank area, a soil vapor survey to identify the nature and extent of halogenated VOC contamination, and if the Department determines it is necessary, in-situ soil vapor extraction to cleanup halogenated VOC's, predominantly TCE, contaminated soils.

The first element of the soil remedy is containment which includes paving areas of the facility that are not currently paved, berming the perimeter of the facility to contain run-off or spills, repairing or replacing damaged sumps, pavement and secondary containment areas, developing a formal inspection and maintenance program for the full site cover (pavement), evaluating and reconstructing the existing site drainage system to contain run-off and prevent infiltration of liquids into subsurface soils, and revising the existing facility closure plan to specify that (1) the facility will be fully paved after final closure and (2) the final site cover shall be constructed to prevent accumulation of water on-site and infiltration into subsurface soils.

The second element of the proposed soil remedy is a deed restriction. A deed restriction puts legally enforce-able limits on the use of a given piece of property. The deed restriction applies to the property and is not impacted by any ownership changes. In this case, the Department has prepared a deed notice that PTI must sign and file with the County of Los Angeles. The proposed deed notice is included as Attachment 12. Unless the property owner can adequately demonstrate otherwise to the Department, the following restrictions would apply: (1) prohibits facility property from being used for residential or other sensitive purpose, (2) prohibits using underlying shallow ground water for domestic use, (3) requires full paving for any commercial or indus-trial uses, (4) requires minimization of any below grade earth moving activities, (5) requires prior notice and agency approval before removing any soils from the property and (6) requires the property owner to maintain site cover (paving) in a manner that prevents infiltration of liquids into subsurface soils.

The third element of the proposed remedy is to design and install a vadose zone monitoring system to provide early detection of contaminant migration from all active sumps, all active clarifiers, Pond 1, Pond 2, filter press, the sewer outlet connection area and any other subsurface units that are designed to accumulate rainfall. These units all actively manage process or waste water and thus pose a higher threat to leak and cause migration of existing contaminants in the subsurface soil. Early detection of releases is important so that the leaking unit may be quickly replaced or repaired before it can mobilize residual soil contamination and impact ground water. Vadose monitoring is also needed to assess the ability of the facility cover element of the corrective action to prevent infiltration into the subsurface.

The fourth element of the proposed remedy includes expansion of the existing surface water monitoring program required under the October 15, 1992 Amended General Industrial Activities Storm Water Permit issued by the LARWQCB. As required by the Permit, PTI has implemented a surface water sampling program at the facility. The Department has reviewed the 1993 Annual Storm Water Report for the facility and has concluded that the sampling program is inadequate because it does not include a sufficient number of monitoring points, does not analyze samples for key facility contaminants such as cadmium, total chromium and hexavalent chromium, and does not adequately compare the analytical results to the applicable storm water contaminant standards. The Department is proposing that this existing surface water sampling program be expanded to include additional parameters and sampling locations, and that PTI submit a revised surface water monitoring plan to the Department for evaluation and approval.

The fifth element of the proposed soil remedy is to use in-situ bioventing to degrade the benzene, toluene, ethylbenzene, xylene and petroleum hydrocarbons in the former underground storage tank area. In-situ bioventing consists of using wells or other means to introduce air and possibly nutrients into the contaminated soils in order to promote biological growth which will act to degrade hydrocarbon contamination. The benzene, toluene, ethylbenzene, xylene and petroleum hydrocarbons released into the soils will be degraded because they are used as a food source by the microorganisms.

The <u>sixth element</u> of the proposed soil remedy consists of PTI conducting a soil vapor survey to identify the full nature and extent of the halogenated VOC contamination. It is proposed that the soil vapor survey be initially focused in the halogenated VOC area identified in <u>Attachment 9</u>. Depending on the findings of the survey, the Department may require PTI to construct and operate an in-situ soil vapor extraction system to remove halogenated VOC's, predominantly TCE, from soils. The tentative establishment of the halogenated VOC area is based on existing soil matrix data. Although the soil matrix data is a good indicator of a halogenated VOC problem, it is not representative of the full extent of contamination. The Department may reduce or expand the halogenated VOC area depending on the findings from the soil vapor survey.

A soil vapor extraction system, if required, will consist of extraction and monitoring wells which will be used to remove the halogenated VOC vapors from the subsurface soils. VOC's tend to partition or "evaporate" from free liquid, dissolved phase or from adsorbed compounds into a gaseous phase in subsurface soils. By extracting the soil vapor, the VOC's are eventually removed from subsurface soils. The soil vapor extraction system, if required, would operate in the unsaturated zone above the ground water.

B. Source, Extent and Impact of Soil Contamination

Soils at the facility contain elevated levels of (1) heavy metals, including lead, cadmium, chromium, copper and zinc, (2) halogenated VOC's, including TCE, 1,2-DCA and PCE, (3) aromatic VOC's, including benzene, toluene, ethylbenzene and xylenes, (4) PCB's, (5) petroleum hydrocarbons, including diesel fuel, gasoline and unidentified heavy hydrocarbons (possibly crude oil), and (6) chlorides.

For easier discussion, the soil contaminants have been separated into groups which are described below:

General Site-Wide Shallow Heavy Metal Soil Contamination: Shallow soils at the facility contain elevated concentrations of cadmium, chromium, copper, lead, nickel and zinc. These contaminants are widely spread across the facility and exist at depths ranging from the surface to approximately 6 feet. Maximum metals concentrations: cadmium at 161 mg/kg, total chromium at 37,000 mg/kg, copper at 23,000 mg/kg, lead at 113,000 mg/kg, nickel at 11,800 mg/kg and zinc at 30,800 mg/kg.

One example situation is shown by the analytical results from boring RS-3 emplaced near the sodium sulfite product and ferric chloride drum storage areas adjoining SWMU 9 (former three-stage clarifier). Shallow soil samples, taken from 3 to 5 feet bgs, exhibited cadmium at 161 mg/kg, total chromium at 4,040 mg/kg, copper at 19,100 mg/kg, lead at 113,000 mg/kg, nickel at 390 mg/kg and zinc at 23,800 mg/kg. Although these metals concentrations dropped off significantly at depths below 6 feet, cadmium continued to 20 feet bgs at a concentration 10 times higher than background.

The Department concludes that although the most significant metals concentrations reside in the shallow site soils, that these contaminants may be mobilized given the proper conditions. Proper conditions would include infiltration of liquids (e.g, wastewaters) into subsurface soils that would leach out metal contaminants and cause them to migrate. The areas of greatest concern include those locations where high metals concentrations are spatially associated with on-going management of liquids (e.g., active sumps, clarifiers, etc.).

Chromium in Deeper Soils: Elevated levels of hexavalent chromium were detected in soil boring SB-7 which is located near the old underground waste chromic-sulfuric acid tank (see map in Attachment 9). The elevated concentrations track from the surface down to the bottom of the boring at 40 feet bgs and ranged from 73.2 mg/kg at the surface to 1,160 mg/kg at 40 feet bgs. The waste chromic-sulfuric acid tank was used for the underground storage of spent chromic-sulfuric acid etching wastes from 1960 to 1974, when it was reportedly removed. These etching wastes contained chromium and copper. The Department has concluded that there was a past release from the tank or associated activities in this area.

PTI initially considered the old spent chromic-sulfuric acid tank the most likely source of hexavalent chromium detected in the ground water at well MW-4. However, an evaluation of ground water data from wells MW-4 and MW-9 suggest that the area surrounding the old spent chromic-sulfuric acid tank may not be the sole source of the high levels of hexavalent chromium contamination found in well MW-4.

Ponds 1 and 2 may have also contributed to the hexavalent chromium contamination detected in well MW-4. Monitoring well MW-4 is located immediately downgradient of Ponds 1 and 2 (SWMU's 4 and 6). During past chemical processing operations, Pond 1 contained waste solutions of ammonium sulfate, sodium chloride, ferrous hydroxide, copper ammonium chloride, sodium sulfate, sulfuric acid, ammonium chloride, free ammonia, copper sulfide, iron sulfide, chrome sulfide, nickel sulfide, zinc sulfide and lead sulfide. Pond 2 contained wastewaters similar in composition to Pond 1.

Throughout the ground water monitoring period, which began in 1985-86, monitoring well MW-9, which is located immediately downgradient from the old chromic-sulfuric acid tank area, had chromium concentrations that are at least 40 times less than those found in well MW-4. There are also inconsistencies in the timing of hexavalent chromium detection at the two wells. For example, hexavalent chromium was not detected in well MW-9 from July 1985 to March 1987 although concentrations in well MW-4 reached up to 550,000 $\mu g/l$ over the same time period. In addition, hexavalent chromium has not been detected in well MW-9 throughout 1992 and 1993 while concentrations in well MW-4 have reached 80,300 $\mu g/l$. Also, for part of the monitoring period, there was definite rise in ground water beneath Ponds 1 and 2 as compared to the rest of the facility. This ground water "high" could have been caused by a release of wastewaters from Ponds 1 and 2. Although the exact on-site location is not certain, the Department has concluded that the PTI facility is the source of the hexavalent chromium contamination in the ground water.

The presently unsaturated Gage Aquifer zone contains chromium contamination associated with Pond 1, Pond 2 and the former underground chromic-sulfuric acid tank. Upon re-saturation, water in the Gage Aquifer would be impacted from the contaminants. The Gage Aquifer is saturated elsewhere in the area.

Halogenated VOC Contaminated Soils: Elevated concentrations of halogenated VOC's, particularly TCE, have been detected in soils at the facility. The highest TCE concentrations were detected in soil borings SB-7, RS-6, WMU12-SB-1, WMU12-SB2 and WMU20B. TCE concentrations are shown below as a function of depth for each boring location. Note that TCE concentrations detected at boring SB-7 showed a significant track from near-surface to 20 feet bgs.

Location	Depth (feet)	TCE Concentration (μg/kg)
SB-7	3.5	4,800
	5	910
	10	260
	15	62
	20	4,300
RS-6	3	110,000
WMU12-SB1	30	37
	40	200
WMU12-SB2	3	55
	5	36
	10	33
	40	96
WMU20B	2.2	2,600

All these borings, with the exception of WMU20B, are located in the vicinity of where the old underground chromic-sulfuric acid tank was situated and near Ponds 1 and 2. Boring WMU20B is located north of Pond 2 in the soils underlying the RCRA regulated hazardous waste drum storage area (SWMU 20). The highest concentration of TCE (110,000 μg/kg) was detected in soils at a depth of 3 feet in boring RS-6 which was located near a former process water sump (SWMU 40). Deeper soil samples from boring RS-6 were not analyzed for halogenated VOC's.

An additional halogenated VOC compound, PCE, was detected in soil boring WMU20-HB1. PCE concentrations were 10,000 μg/kg at 2 feet bgs and 206 μg/kg at 6 feet bgs. Two soil samples from this hand augered boring were analyzed for halogenated VOC's (maximum depth 6 feet bgs). WMU20-HB1 is located immediately adjacent to boring WMU20B in the hazardous waste drum storage area.

As shown on the map in <u>Attachment 9</u>, the halogenated VOC soil contamination described above is located hydraulically upgradient from where elevated levels of TCE were detected in the ground water (MW-4 and MW-9). Although the soil matrix data provides a good indicator that a halogenated VOC problem exists at the PTI facility, it is not considered to be representative of the full extent of the contamination. This is because halogenated VOC's tend to partition or "evaporate" from free liquid, dissolved phase or from adsorbed compounds into a vapor phase in subsurface soils. This vapor phase could migrate throughout the subsurface soils from areas of the facility where no soil matrix sampling was done. Although the existing data may not be completely representative of the full extent of contamination, the Department has concluded that this soil contamination is the probable source for the continuing elevated TCE concentrations in ground water at wells MW-4 and MW-9. The tentative halogenated VOC source area is shown on <u>Attachment 9</u>.

The presently unsaturated Gage Aquifer is contaminated with halogenated VOC's, predominately TCE. Upon re-saturation, water in the Gage Aquifer would be impacted from the contaminants. The Gage Aquifer is saturated elsewhere in the area.

<u>Hydrocarbon and Aromatic VOC Contamination:</u> Elevated concentrations of total petroleum hydrocarbons (TPH) and aromatic VOC contaminants such as benzene, toluene, ethylbenzene and xylenes are focused in the former UST area but also occur at other locations throughout the facility. TPH is a generic indicator of hydrocarbons which PTI contends in this case is associated with diesel fuel, gasoline and crude oil.

Two UST's (1 diesel, 1 gasoline) were removed from the facility in July 1989. Soils beneath the two UST's contain elevated levels of aromatic VOC's and extractable TPH. In the RFI Reports, PTI argues that due to the preponderance of extractable TPH versus volatile TPH, that the UST area contamination is primarily related to diesel fuel.

According to existing data, the UST area hydrocarbon contamination appears to be limited to the unsaturated zone and ranges vertically from about 5 to 37 feet bgs. A presently unsaturated zone, identified by PTI as the Gage Aquifer, contains contaminants from the former UST area. Upon resaturation, water in the Gage Aquifer would be impacted from the hydrocarbon and aromatic VOC contaminants. The Gage Aquifer is saturated elsewhere in the area.

Nine of the eleven deep borings in the former UST area and all five hand auger borings in the base of the excavation have extractable TPH concentrations in excess of 1000 mg/kg at depths to 33 feet bgs. All of the hand auger borings contained elevated levels of benzene, ethylbenzene and xylenes and four were high for toluene. More significantly, four of the eleven borings had benzene in excess of 300 μg/kg at depths to 37 feet bgs; six of the eleven borings had ethylbenzene greater than 1000 μg/kg at depths to 28 feet bgs; two of the eleven borings had toluene in excess of 300 μg/kg at depths to 33 feet bgs; and six of the eleven borings had xylene concentrations greater than 1000 μg/kg to depths of 28 feet bgs.

In addition, PTI has identified separate areas of the facility that are contaminated with a heavier hydrocarbon believed to be crude oil. PTI argues that the crude oil was released into the soils in the past prior to PTI operations at the property. This conclusion is based on a simple carbon chain analysis which roughly separated diesel fuel contamination from crude oil contamination. The exact lateral boundaries between the diesel fuel and crude oil contamination are not known (see map in Attachment 9).

Some patterns of data suggest the possibility that releases of aromatic VOC's and 1,2-DCA from the former UST area may have impacted ground water. Ground water from monitoring well MW-16, which is located directly downgradient of the former UST area, contains elevated concentrations of aromatic VOC's and 1,2-DCA. 1,2-DCA is a known gasoline additive. Well MW-1S, which is located upgradient of the former UST area, has not detected elevated levels of aromatic VOC's and 1,2-DCA.

Other areas of the facility where aromatic VOC's and TPH have been detected include borings RS-6 and SB-7. Boring RS-6 is located near Sump 8 (SWMU 40) approximately 30 feet north of Pond 2 and boring SB-7 is located approximately 60 feet to the northwest of Pond 2. Data from boring RS-6 showed that soil at 3 feet bgs contained TCE at 110,000 μg/kg, ethylbenzene at 9000 μg/kg, total xylenes 43,000 μg/kg and TPH at 460 mg/kg. No other soil samples from boring RS-6 were analyzed for VOC's. Data from boring SB-7 showed that soil at 20 feet bgs contained 250 μg/kg of ethylbenzene, 760 μg/kg of total xylenes and 2300 mg/kg of TPH.

<u>PCBs in Shallow Soils:</u> Shallow soils at the facility contain elevated concentrations of PCB's (Aroclor-1260). Most significant were detections in the surface soils of the ferric chloride rehabilitation area at the southwest corner of the facility and off-site in the west parking lot area. PTI argues that both on-site and off-site PCB contamination is derived from past operations when the facility was used as a railroad switching station. Maximum on-site PCB concentrations in the ferric chloride rehabilitation area range from 69 to 710 mg/kg.

The west parking lot area is located off-site immediately to the west of the facility laboratory. Maximum PCB concentrations in surface soils at the off-site west parking lot range from 100 to 1,500 mg/kg. This property, which was formally leased by PTI, is owned by the SPTCo. The west parking lot area is currently covered with paving and/or gravel and plastic and posted with warning signs. The Site Mitigation Unit at the Department is working with SPTCo to address the PCB contamination.

<u>General Off-Site Soil Contamination:</u> The RFI Reports discuss PTI's off-site soil sampling along the southern property line which adjoins the SPTCo rail line. Specifically, shallow samples were obtained from each of two drainage ditches off-site to the south, from the western parking lot area and from the railroad siding along the southern perimeter of the facility. Metals concentrations were reported in some drainage ditch surface soils at values greater than 10 times background; PCBs were detected in two drainage ditch locations;

arsenic was detected in three drainage ditch locations; petroleum hydrocarbons were detected at one drainage ditch location; and no aromatic or halogenated VOC's were reported at the selected detection limits from any of the drainage ditch sampling locations. As discussed above, PCBs were detected in the shallow soils at western parking lot.

The April 23, 1993 RCRA Facility Risk Assessment Report includes an evaluation of off-site soil contamination in the two drainage ditches south of the facility. The report concludes that the contaminated surface soils in the two drainage ditches do not pose a significant threat to the local community or to construction workers who may be excavating soils in the area. For more details on the risk assessment, please see the complete report which is a key document available for public review.

C. Proposed Soil Cleanup Standards

The proposed cleanup standards for soil include both general standards that apply over the entire facility and site-specific cleanup standards that apply to the former UST area and halogenated VOC remediation area. These proposed standards must be consistent with all applicable federal, state and local regulations. Because of the contaminant sources, such as the former UST area and other hazardous waste management activities at the facility, this involves the Department of Toxic Substances Control, State Water Resources Control Board (SWRCB), Los Angeles Regional Water Quality Control Board (LARWQCB) and local implementing agencies, such as the County of Los Angeles, Department of Public Works Local Oversight Program.

In proposing cleanup standards for the PTI facility, the Department considered many factors including California H&SC Section 25200.10, regulations under Title 22, Sections 66264.90 through 66264.100, and the statutory authority of the LARWQCB to require cleanups which is derived from the California Water Code, Division 7, Section 13304 wherein the LARWQCB can require complete cleanup of all waste discharged and restoration of affected water to background conditions (water quality that existed before the discharge). State Board Resolution No. 92-49, entitled "Policies and Procedures For Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304" describes remediation of pollution. It indicates that SWRCB regulations governing the discharges of waste to land, which are contained in the California Code of Regulations (CCR), Title 23, Division 3, Chapter 15, may be applicable. It states that "If cleanup and abatement involves actions other than removal of the waste, such as containment of waste in soil or ground water by physical or hydrological barriers to migration (natural or engineered), or in-situ stabilization through chemical fixation or bioremediation, the Regional Water Board shall apply Chapter 15 to the extent that it is technologically and economically feasible to do so." This is echoed in the LARWQCB Basin Plan which indicates that should significant amounts of waste remain on-site, the Regional Board can implement regulations of Chapter 15.

The LARWQCB Basin Plan states that "Water quality is threatened by the migration of pollutants from soils in the vadose zone; therefore cleanup levels in the vadose zone are set at background concentrations." At those sites where background cannot be obtained, site-specific levels for cleanup may be considered "...provided that: (i) such levels present no present or potential risk to water quality, and (ii) health risks from surface or subsurface exposure meet all applicable regulations and guidelines". State Board Resolution 92-49 generally requires cleanup that promotes attainment of background water quality and that "...any cleanup levels less stringent than background shall: (1) Be established according to the method prescribed for the establishment of a concentration limit greater than background for corrective action at leaking waste management units in Article 5 of Chapter 15 [23 C.C.R. S2550.4(c)". The Department has considered these regulations and policies in the development of soil cleanup standards for the PTI facility.

Cleanup standards for the former UST area take into consideration that California has specific concerns relative to cleaning up hydrocarbon releases from underground fuel storage tanks. These concerns are embodied as enacted legislation (Health and Safety Code, Division 20, Chapter 6.7) and as promulgated regulations (Title 23, California Code of Regulations, Division 3, Chapter 16). Regulatory authority for overseeing investigations of ground water pollution and corrective actions related to USTs in the Santa Fe Springs rests with the LARWQCB. However Los Angeles County is a participant in SWRCB's Local Oversight Program (LOP) wherein it shares regulatory responsibility with the state for investigation of leaks and corrective action.

Practical guidance for addressing releases from USTs is discussed in the "Leaking Underground Fuel Tank Manual, Guidelines for Site Assessment, Cleanup and Underground Storage Tank Closure", dated October 1989 (LUFT Manual) issued by the SWRCB. While this manual is neither a policy nor a regulation, it establishes procedures for verifying the occurrence of a leak from an underground fuel storage tank and for assessing the impact to soil and ground water (crude oil not included).

State Board Resolution No. 92-49, entitled "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304", indicates the cleanup activities must be planned and performed by qualified professionals, licensed where applicable, and both competent and proficient in the fields pertinent to the required activities. California Business and Professions Code Sections 6735, 7835 and 7835.1 require that engineering and geologic evaluations and judgements be performed by or under the direction of California registered professionals.

1. **Proposed General Soil Standards**

   The general soil standards are applicable throughout the facility for all soil contaminants, which include, but are not limited to cadmium, chromium, copper, lead, PCB's, aromatic and halogenated VOC's, diesel fuel and heavier hydrocarbons possibly crude oil. The general standards are as follows:

   - Prevent human exposure to contaminated soils.
   - Minimize migration of chemical contaminants from soils to the extent necessary to be protective of ground water.

2. **Proposed Soil Cleanup Standards for Former Underground Storage Tank Area**

   The proposed cleanup standards for the former UST area are to reduce the concentration of benzene, toluene, ethylbenzene, total xylenes and extractable TPH in the subsurface soils to levels that are protective of ground water. TPH is a generic indicator of hydrocarbons that in this case is related to diesel fuel.

Benzene, toluene, ethylbenzene, total xylenes and diesel fuel have been released from the PTI facility into the unsaturated Gage Aquifer. These contaminants threaten any ground water that may resaturate the Gage Aquifer. The Gage Aquifer is saturated elsewhere in the area.

The proposed cleanup standards for the former UST area are listed below. The standards are derived from the drinking water MCLs and are thus protective of ground water both in the Hollydale Aquifer and in the Gage Aquifer assuming that it becomes resaturated. The proposed standard for TPH is consistent with local agency requirements. These proposed standards are consistent with California legal authorities, regulations and guidance discussed above.

Compounds	Concentrations
Benzene	0.001 mg/kg
Toluene	1 mg/kg
Ethylbenzene	0.68 mg/kg
Xylenes (total)	1.75 mg/kg
TPH	100 mg/kg

The cleanup standards must be met in soils at the former UST area. The former UST area is located in the center of the facility and is roughly bounded by soil borings UST-SB3, UST-SB4, UST-SB5, UST-SB1, UST-SB2, and UST-SB-7.

3. Proposed Soil Cleanup Standards For Halogenated VOC Remediation Area

The proposed cleanup standard is to reduce halogenated VOC, especially TCE, vapor levels in soils to concentrations that are protective of ground water. To accomplish this, a soil vapor survey will first be done to fully define existing soil vapor levels and the full extent of the area needing remediation. It is proposed that the soil vapor survey be initially focused in the halogenated VOC area identified in Attachment 9. Depending on the findings of the vapor survey, the Department may reduce or expand the halogenated VOC area.

After the findings of the soil vapor survey have been evaluated, the Department may require PTI to install and operate a soil vapor extraction system. It is proposed that the soil vapor extraction system, if required, continue to operate until PTI can adequately demonstrate to the Department, using the following performance based criteria, that the cleanup standard has been achieved.

- A quantitative analysis of halogenated VOC soil vapor data showing that VOC's, especially TCE, concentrations have been reduced to levels that are protective of ground water.

  The analysis shall include the development and analysis of halogenated VOC soil vapor iso-concentration plots for equilibrium conditions. The iso-concentration plots must show a definitive reduction in area over time.

  The analysis shall include time verses concentration graphs showing variations in outlet concentrations from each soil gas monitoring probe or well. The graphs must show any rebound effects and clearly indicate that asymptotic concentrations have been reached.

  Soil gas data used to demonstrate that the cleanup standard has been obtained must be analyzed in an independent mobile laboratory at the facility.

- Fate and transport modeling to demonstrate that any measured residual soil vapor concentrations will not impact ground water. The Department must provide PTI with written approval of any fate and transport model before the model can be used to demonstrate that the cleanup standard has been achieved.

- If required by the Department, results of confirmation soil matrix sampling from fine-grained zones where long-term or differential halogenated VOC effects might be expected (e.g., clay/silt or organic-rich soils).

D. Development of Cleanup Options for Soil

Cleanup options for soils were developed using the same process that was used to develop the cleanup options for ground water. This process is discussed in Section 8.D of this SB. As a result of the analysis, the following cleanup options for soils were developed:

Soil Option 1 - This option consists of containment measures and deed restrictions. Containment measures include paving areas of the facility that are not currently paved, developing a formalized inspection and maintenance program for the site cover, and assessing existing drainage patterns to determine if additional sumps are needed. Deed restrictions include prohibiting certain uses of the property as well as limiting and/or controlling activities that would disturb contaminated soil. In the CMS Report, PTI provides a general discussion of imposing deed restrictions to limit property use but does not discuss specific actions such as prohibiting residential use.

The Department and U.S. EPA have concluded that it is appropriate to modify Option 1, considering the elevated concentration of contaminants in shallow soil, to prohibit residential and other sensitive uses of the property. Thus, the Department has modified Soil Option 1 to include specific property use limits in the deed restriction. The property use limits are summarized below:

Unless the property owner can adequately demonstrate otherwise to the Department, the following restrictions would apply:

- Prohibits the facility or property from being used for residential or for other sensitive purposes.
- Prohibits use of the underlying shallow ground water for domestic use.
- Requires full paving of property for any commercial or industrial uses.
- Requires minimization of any below grade earth moving activities.
- Requires notification and prior Department approval before excavated soils may be removed from the property.
- Prohibits removal of any soils from the property unless to an appropriate disposal location.

- Requires that the site cover be adequately maintained to prevent infiltration into the subsurface.

Soil Option 2 - This option includes all the elements from Option 1 (as modified) plus a program to monitor for potential re-saturation of the Gage Aquifer by inspecting and testing monitoring well MW-6A quarterly for the presence of ground water. The monitoring of MW-6A would be incorporated into the comprehensive ground water monitoring plan along with agency notification requirements should re-saturation occur.

Soil Option 3 - This option includes all the elements from Options 1 (as modified) and 2 plus optional employment of in-situ bioventing as a remediation measure to address hydrocarbon contamination from the former underground storage tank area. Vadose zone wells would be installed in the former underground tank area to allow the introduction of air and possibly nutrients into the subsurface to promote biological growth and hydrocarbon degradation.

In the CMS Report, PTI proposes that in-situ bioventing be used only if the Gage Aquifer were to become re-saturated. However, the Department and U.S. EPA have concluded that this may not be feasible due to limitations imposed on air circulation by saturation. Therefore, the Department is modifying Option 3 to eliminate the Gage Aquifer re-saturation contingency condition. The modified Option 3 would now require PTI to implement bioventing in the former UST area.

Soil Option 4 - This option includes all the elements from Options 1 (modified), 2 and 3 (modified) plus excavation and off-site disposal of hydrocarbon contaminated soil from the former underground storage tank area.

Soil Option 5 - This option includes all the elements of Options 1 (modified) and 2 plus excavation and off-site disposal of hydrocarbon contaminated soil from the former underground storage tank area.

In addition to the five cleanup options considered in the CMS Report, the Department and U.S. EPA created a sixth option that includes a soil vapor survey to determine the nature and extent of halogenated VOC contamination, soil vapor extraction or SVE if necessary to address halogenated VOC soil contamination, vadose zone monitoring for early detection of contaminant migration in soils, installation of berming around the facility perimeter to contain run-off or spills, expansion of the existing surface water monitoring program and revision of the existing facility closure plan to be consistent with the proposed soil cleanup options.

Soil Option 6 - This option includes all the elements of Option 3 (modified) plus a soil vapor survey, possible SVE system, vadose zone monitoring, berming the facility perimeter, expansion of existing surface water monitoring and revision of the existing facility closure plan.

PTI would conduct a soil vapor survey to identify the full nature and extent of the halogenated VOC contamination. Depending on the findings of the survey, the Department may require that PTI construct and operate a soil vapor extraction or SVE system.

If an SVE system is required, wells or probes would be installed to extract or monitor halogenated VOC soil vapors in the unsaturated subsurface soils. Halogenated VOC's are volatile compounds which tend evaporate into a vapor phase in subsurface soils. By extracting the contaminated soil vapor, removal of the VOC's will be accomplished. Construction of the SVE system, if required, would include the installation of air moving equipment (e.g., blowers) to create a vacuum, monitoring wells or probes to sample subsurface gases in order to measure extraction effectiveness, and a carbon canister treatment system to remove the TCE and any other volatile organic compounds from the soil vapors.

Vadose zone monitoring includes the installation and operation of subsurface devices to provide early detection of contaminant migration from all active sumps, all active clarifiers, Pond 1, Pond 2, filter press, the sewer outlet connection area, and any other subsurface units that are designed to accumulate rainfall. These units all actively manage process or waste water and thus pose a higher threat to leak and cause migration of existing contaminants in the subsurface soil. Early detection of contaminant migration is important so that the leaking unit may be quickly replaced or repaired before it can mobilize residual soil contamination and impact ground water. Vadose zone monitoring is also needed to assess the ability of the facility cover element of the corrective action to prevent infiltration into the subsurface.

Surface water monitoring is required for the facility under the October 15, 1992 Amended General Industrial Activities Storm Water Permit issued by the LARWQCB. Under Option 6, PTI would be required to add additional constituents to the existing monitoring program, sample at additional locations and submit a revised surface water monitoring plan to the Department that would specify how surface water run-off from the facility would be sampled and analyzed.

The existing facility closure plan, which specifies how the facility will be closed after industrial operations have ended, is not consistent with the proposed soil clean-up options. It is proposed that PTI revise the facility closure plan to specify that (1) the facility will be fully paved after final closure and (2) the final site cover shall be constructed to prevent accumulation of water on-site and infiltration into subsurface soils.

E. Comparative Analysis of Soil Cleanup Options

A comparative analysis of soil cleanup options was done using the same criteria that were used for evaluating ground water options.

The following comparative analysis of the soil cleanup options was made using the four corrective action standards and five remedy selection decision factors described in Section 8.E. of this SB.

1. <u>Protection of Human Health and Environment.</u>

   Option 6 is considered the most protective option because it includes active remediation of site contaminants along with measures to ensure that contaminants do not come in contact with people. These protective measures include evaluation and construction of containment features (e.g., berms), vadose zone monitoring, Gage Aquifer monitoring for the presence of ground water, surface water monitoring and deed restrictions to limit future property uses. Options 1 and 2, which rely primarily on deed restrictions and some containment measures, are considered significantly less protective because they do not include active remediation of soil contaminants or measures to monitor contaminant migration in subsurface soils. Options 3, 4 and 5 are limited because they only require active remediation of the former UST area and do not address halogenated VOC's nor include vadose zone monitoring. All options use deed restrictions to limit future use of the property and some containment measures to prevent human contact with the metals and PCB contaminated soil. Only Option 6 relies on bioventing to actively address the aromatic VOC/hydrocarbon contaminated soils in the former UST area, and a soil vapor survey with possible soil vapor extraction to address halogenated VOC contamination (primarily TCE). Once the concentrations of aromatic and halogenated VOC's meet the cleanup standards, they will no longer pose a threat should site conditions change in the future (e.g, if Gage Aquifer becomes resaturated).

None of the options require active remediation, such as excavation, for the heavy hydrocarbon, cadmium, chromium, copper, lead, and PCB contamination. The April 23, 1993 RCRA Facility Risk Assessment Report includes a quantitative analysis of potential impacts to human health from surface soil contamination both on-site and off-site. The soil exposure pathways for surface soil which may be relevant to the site include dermal contact with soil, ingestion of soil and inhalation of soil particulates and/or vapors. The potentially exposed populations to these pathways could include on-site workers, off-site workers and nearby residents. The risk assessment concludes that risks from the contaminated on-site surface soils are acceptable for continued industrial use of the fully paved facility but are not acceptable for residential development. The site paving is intended to prevent direct contact with the contaminated soil and also prevent rainwater infiltration and the leaching of contaminants from subsurface soils into the ground water. For more details on the risk assessment, please see the complete report which is a key document available for public review.

2. <u>Attainment of Cleanup Standards.</u>

Option 6 has the best chance to meet the cleanup standards because it contains requirements to both cleanup and prevent human contact with contaminated soil. Options 1 and 2 will not attain all of the cleanup standards because they do not require any active remediation of contaminated soils. Options 3, 4 and 5 are limited because they require remediation of only the aromatic VOC/hydrocarbon contamination in the former UST area. All of the options include some containment measures.

3. Controlling the Sources of Releases

Option 6 provides the best potential to control releases from contaminated soils into the ground water because it includes containment measures, Gage Aquifer monitoring for the presence of ground water and vadose zone monitoring requirements. All options require that contaminated soils be capped thus reducing the potential for direct human contact and minimizing the infiltration of rainwater into the subsurface soils. Infiltration of rainwater into the subsurface soils could cause contaminants to leach out of the soil and into the ground water. None of the options include vadose zone monitoring to quickly identify releases into subsurface soils. Options 1 and 2 contain no active remediation and are thus considered as not as effective at controlling releases from contaminated soils. Options 3, 4, and 5 are limited because they only require remediation of aromatic VOC/hydrocarbon contaminated soils in the former UST area and do not address halogenated VOC's. Only Option 6 acts to control continued migration of halogenated VOC's, particularly TCE, by requiring remediation to concentrations that no longer pose a threat to ground water.

4. Compliance with Waste Management Standards

All cleanup options must meet applicable federal, state and local standards for management of wastes.

5. Long-Term Reliability and Effectiveness

Option 6 is considered to have the best overall long-term reliability and effectiveness. Although Options 1 and 2 include technologies (e.g., paving) that are frequently used and are well understood, the Department has concerns over the long term reliability. The paving proposed by PTI is not the equivalent of an engineered capping system that would be required to control infiltration at a landfill. In addition, significant ongoing wastewater operations in sumps and other underground piping systems provide a continuing threat of leakage over time.

Effectiveness, as measured by the magnitude of residual risk remaining after treatment, would be greater in the long run with Options 3, 4, 5 and 6 because contaminant concentrations would be permanently reduced through bioventing, soil vapor extraction (if required) and/or excavation. Option 6 is considered to have the best effectiveness because it is the only option that requires a soil vapor survey and possible remediation of halogenated VOC's in addition to the other contaminants.

6. Reduction of Toxicity, Mobility, or Volume of Wastes

Option 6 provides the best overall reduction in toxicity, mobility or volume of wastes because it requires active remediation of soils contaminated with aromatic VOC's/hydrocarbons and possibly halogenated VOC's. Bioventing will permanently reduce aromatic VOC's/hydrocarbon contaminant concentrations in subsurface soils. The soil vapor survey will identify the nature and extent of halogenated VOC contamination. Depending on the findings of the survey, the Department may require a full SVE remediation system. The bioventing, soil vapor survey and possible SVE system are especially important for protecting ground water in the Gage Aquifer if re-saturation were to occur.

Options 1 and 2 are considered much less effective because they rely solely on capping and deed restrictions and do not include active remediation measures. Options 3, 4, and 5 are limited because they require remediation in the former UST area and do not address halogenated VOC's.

7. Short-term effectiveness

Option 6 is considered to have a higher short-term effectiveness because it will be able to achieve the cleanup standards more quickly and is more protective of the community during implementation of the corrective measure. Option 6 incorporates the paving and deed restriction requirements of Option 1 with active remediation of aromatic VOC's/petroleum hydrocarbons and halogenated VOC's. Options 1 and 2 cannot fully achieve the cleanup standards, even in the short-run, and are thus considered to have a lower short-term effectiveness. Options 4 and 5 are considered less protective of the community because they would require excavated soil to be transported by truck along city streets for off-site disposal.

8. Implementability

Options 1 and 2 are easiest to implement because there are no major impediments to establishing deed restrictions, paving currently unpaved areas of the facility and continuing to monitor the Gage Aquifer for the presence of ground water. Options 3, 4 and 6 include bioventing in the former UST area which may require collection of additional field data (e.g., gas permeability, moisture content, oxygen and carbon dioxide distributions) for adequate system design. Options 4 and 5 include excavation of contaminated soil and could be hampered by limited access and available storage space for excavated soil. Option 6 adds the soil vapor survey and possible SVE system for halogenated VOC's which may require additional baseline development and field testing for proper system design. Although bioventing and SVE may require some additional time to design and implement, the Department considers these to be well-understood technologies that could be readily implemented at the PTI facility.

9. Cost

The estimated cost for each clean-up option is presented below. The estimated cost is the total present worth value taken directly from the CMS Report. The Department and U.S. EPA have concluded that PTI has underestimated the cost of Option 5. The cost of Option 5 is based on the excavation and disposal of a minimal volume, 100 cubic yards, of contaminated soil from the former UST area. Given the size of the former UST area, it appears that excavation of additional soil may be needed to meet the cleanup standards.

The costs for Option 6 were estimated by taking the costs from Option 3 (CMS Report) and adding the costs of installing 30 vadose zone monitoring points ($45,000) and the costs, if required, of installing and operating the SVE system ($145,280, see Attachment 13).

Option	Action	Estimated Cost
1	Deed Restrictions Capping	$128,700

2	Deed Restrictions Capping Gage Aquifer Monitoring	$156,400
3	Deed Restrictions Capping Gage Aquifer Monitoring Bioventing UST Area	$303,300
4	Deed Restrictions Capping Gage Aquifer Monitoring Bioventing UST Area Excavation and Disposal of UST Area Hotspots	$383,900
5	Deed Restrictions Capping Gage Aquifer Monitoring Excavation and Disposal of UST Area Hotspots	$237,400
6	Deed Restrictions Capping Vadose Zone Monitoring Bioventing UST Area Soil Vapor Survey/Extraction	$493,580

F. Rationale for Selection of Proposed Soil Remedy

The Department and U.S. EPA have concluded that the proposed remedy Option 6 best meets the corrective action standards and remedy selection factors. The proposed remedy is the most protective of human health and the environment, provides the best potential to control migration of contaminants from soils into ground water and is consistent with California regulations and policy.

PTI prefers Option 1 (unmodified), which consists of limited deed restrictions and paving, but does not include any active remediation. This preference is based on the following reasons:

a. PTI interpretation of soils data indicates that hydrocarbon contamination in the former underground storage tank area does not extend below the underlying clay aquitard.

b. PTI interpretation that no diesel fuel contaminants that can be clearly attributed to the former underground storage tank area have been detected in the downgradient ground water (well MW-16).

c. PTI interpretation that subsurface conditions such as low hydraulic conductivity may limit the effectiveness of moving air through the soils which would thus hamper bioventing and SVE.

The proposed remedy for soils, Option 6, includes deed restrictions to prevent future residential use of the property, containment measures to prevent human contact with contaminated soils, berming to contain surface water run-off, vadose zone monitoring to quickly identify contaminant migration in subsurface soils, expansion of existing surface water monitoring to measure contaminants in surface water discharged from the facility, revision of existing facility closure plan to be consistent with selected remedy, a soil vapor survey to identify the nature and extent of halogenated VOC contamination, a possible in-situ soil vapor extraction system to cleanup soils contaminated with halogenated VOC's, and in-situ bioventing to cleanup hydrocarbon contaminated soils in the former underground fuel storage tank area.

The Department and U.S. EPA have concluded that the proposed remedy is protective of human health and the environment even though it does not eliminate all contamination from soils at the facility. The soil contaminants remaining in place will be paved and monitored to ensure that they do not come into contact with people. This was demonstrated in the U.S. EPA approved risk assessment analysis which concluded that risks from the contaminated on-site surface soils are acceptable for continued industrial use of the paved facility but are not acceptable for residential development. The Department has authority to require additional remedial action if these contaminants are shown to be a potential threat to human health and/or the environment.

Vadose zone monitoring is protective of human health and the environment and is consistent with California regulations under Title 22, Sections 66264.90 through 66264.100. Vadose zone monitoring is protective because it provides early detection of contaminant migration from units that manage or transport process or waste water. These units all actively manage process or waste water and thus pose a higher threat to leak and cause migration of existing contaminants through the subsurface soil. Vadose zone monitoring is particularly important considering that soil contaminants will remain in place at the facility. Early detection of contaminant migration will allow the leaking unit to be quickly replaced or repaired before it can impact ground water. Vadose monitoring is also needed to assess the ability of the facility cover element of the corrective action to prevent infiltration into the subsurface. Vadose zone monitoring is consistent with California regulations contained in Chapter 15 of Title 23, which provides that the discharger "..... shall establish an unsaturated zone monitoring system for each waste management unit".

Expansion of the existing surface monitoring program is protective of human health and the environment and is consistent with the October 15, 1992 Amended General Industrial Activities Storm Water Permit issued by the LARWQCB and with California regulations under Title 22, Sections 66264.90 through 66264.100. The existing surface water monitoring program is not adequate because it does not include a sufficient number of monitoring points, does not analyze samples for key facility contaminants such as cadmium, total chromium and hexavalent chromium, and does not adequately compare the analytical results to the applicable storm water contaminant standards. The proposed remedy corrects these deficiencies.

The proposed remedy provides the best potential to control migration of contaminants from the soils into the ground water. The site cover (paving) will prevent rainwater infiltration into subsurface soils and thus reduce the chance of contaminants leaching from soils into ground water. The soil vapor survey and the SVE system, if required, will ensure that halogenated VOC vapor concentrations in the soil are at levels that are protective of ground water. There are aromatic VOC's, halogenated VOC's, hydrocarbon and chromium contaminants in the currently unsaturated Gage Aquifer. Although the Gage Aquifer has been dry for some time, there are no guarantees that it will remain unsaturated in the future. To address this possibility, the Department has concluded that in-situ bioventing, the soil vapor survey, and the SVE system (if required) will be particularly useful in permanently reducing contaminant concentrations to levels that will not pose a threat to either the underlying Hollydale Aquifer or the Gage Aquifer if it should become saturated.

The state and local agencies that typically oversee cleanup of UST releases also agree that bioventing is a reasonable approach for addressing the aromatic VOC/hydrocarbon contamination in the former UST area. The Los Angeles County Department of Public Works and the LARWQCB support the proposed remedy because it will prevent future problems.

The proposed remedy for the former UST area is consistent with California regulations and policy. The former USTs are considered solid waste management units under Section 66260.10 of the California Code of Regulations. As such, the former USTs are subject to corrective action under Section 25200.10 of the Health and Safety Code. The former UST area must also be remediated as required in Sections 25280 to 25299.6 of the California Health and Safety Code and applicable provisions of California Title 23, Chapter 16 regulations.

In terms of implementability, information from PTI's northern neighbor suggest that soils in the area may be amenable to bioventing and soil vapor extraction. Pilot Chemical Company, PTI's northern neighbor, conducted tests for a possible soil vapor extraction system. Results from the tests lead the Department and U.S. EPA to conclude that the soil's air permeability properties are amenable to bioventing and soil vapor extraction.

To summarize, the proposed remedy prevents human contact with the contaminated soil now and into the foreseeable future, limits property use to industrial or commercial purposes, requires vadose zone monitoring, expansion of existing surface water monitoring and reduces aromatic and halogenated VOC concentrations to levels that will be protective of ground water. The proposed remedy would also have less environmental impact to the local community because no contaminated soil will be excavated and transported along city streets. Vadose zone monitoring of the unsaturated soils will ensure that any leaking units will be quickly identified and repaired, and that the facility cover element of the corrective action is operating properly. Ground water monitoring will ensure, that if any of the soil contaminants ever reach the ground water, that the problem will be identified.

10. GLOSSARY

Administrative Order - A legal agreement signed by U.S. EPA and an individual, a business, or other entity through which the responsible party agrees to perform or pay the cost of a site cleanup. The order describes actions to be taken at a site and can be enforced in court. A consent order does not have to be approved by a judge.

Administrative Record - The documents and information that are considered or relied upon to make a remedy selection decision for a site. These documents are available for public inspection usually at the nearest public library to the site and at the Department office in Glendale, California.

Aquifer - An underground formation composed of materials such as sand or gravel that can store and supply ground water to wells and springs. Most aquifers used in the United States are within a thousand feet of the earth's surface.

Aromatic VOC's or Aromatic Volatile Organic Compounds include, but are not limited to, benzene, toluene, ethylbenzene and xylenes.

bgs - Abbreviation for "below ground surface."

Bioventing - The introduction of air and possibly nutrients into subsurface soils to promote biological activity and hydrocarbon degradation.

BTEX - Abbreviation for the compounds benzene, toluene, ethylbenzene and xylene.

Corrective Action - Those actions taken to investigate and clean-up contaminant releases from hazardous waste treatment, storage, and disposal facilities.

Corrective Measures Study (CMS) - A study conducted by the facility owner or operator to identify and evaluate alternative remedies to address contaminant releases at a site.

Corrective Measures Implementation (CMI) - During the CMI, the facility owner or operator designs and constructs the final remedy selected by the Department. The owner or operator must also operate, maintain, and monitor the system after construction.

Department or California Environmental Protection Agency, Department of Toxic Substances Control - The state agency which is responsible for regulating hazardous waste in California. The Department has the authority to enforce federal and state hazardous waste regulations.

Downgradient - Similar to downstream, ground water flows from upgradient to downgradient.

Ground Water - Water, found beneath the earth's surface, which often supplies wells and springs. Because ground water is a major source of drinking water, there is a growing concern to protect and/or cleanup ground water where industrial pollutants are contaminating ground water.

Halogenated VOC's or Halogenated Volatile Organic Compounds include, but are not limited to, the following compounds: tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA), 1,2- dichloroethane (1,2-DCA), trans-1,2-dichloroethene (1,2-DCE), carbon tetrachloride, 1,1,1-trichloroethane (1,1,1-TCA), chloroform and methylene chloride.

Hexavalent Chromium (CR+6) - A oxidized form of chromium which is a heavy metal and is toxic if ingested.

In-Situ Treatment - Treatment of contamination in-place.

Institutional Controls - Non-engineered controls (such as land use restrictions) which are implemented to reduce risk from a site.

Los Angeles Regional Water Quality Control Board (LARWQCB) - The State agency tasked with protecting water resources in the greater Los Angeles area.

Maximum Contaminant Level or MCL means the maximum permissible level of a contaminant in water delivered to any user of a public water system. MCL's are enforceable standards.

mg/kg - Milligrams of contaminant per kilogram of soil, equivalent to parts per million.

PCE - Abbreviation for compound tetrachloroethene. Tetrachloroethene, also called perchloroethene, is a liquid solvent used in dry cleaning, textile industries and chemical manufacturing.

RCRA Facility Assessment (RFA) - A detailed review of records and information on the facility to identify and characterize all solid waste management units at the site; this includes a site inspection to examine all parts of the facility and identify areas of potential contamination.

RCRA Facility Investigation (RFI) - An in-depth study to determine the nature and extent of contamination at a RCRA treatment, storage, or disposal facility; establish criteria for cleaning up the site; identify preliminary alternatives for cleaning up the site; and support the technical and cost evaluation of the alternatives.

Resource Conservation and Recovery Act (RCRA) - A federal law that established a regulatory system to track hazardous waste from the time of generation to disposal. The law requires facilities to obtain a permit if they treat, store or dispose of hazardous waste. RCRA is designed to prevent new, uncontrolled hazardous waste sites.

Solid Waste Management Unit (SWMU) - Any discernable unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been routinely or systematically released.

Trichloroethene (TCE) - A liquid used as a solvent, metal degreasing agent, and in other industrial applications. TCE may be a human carcinogen.

μg/l - Micrograms of contaminant per liter of water, equivalent to parts per billion.

UST - Abbreviation for underground fuel storage tank.

Upgradient - Similar to upstream, ground water flows from upgradient to downgradient.

Vadose Zone - The zone between the land surface and the surface of the saturated zone. The surface of the saturated zone is also referred to as the ground water table.

Volatile Organic Compound (VOC) - Any organic compound which vaporizes and reacts with the atmosphere.

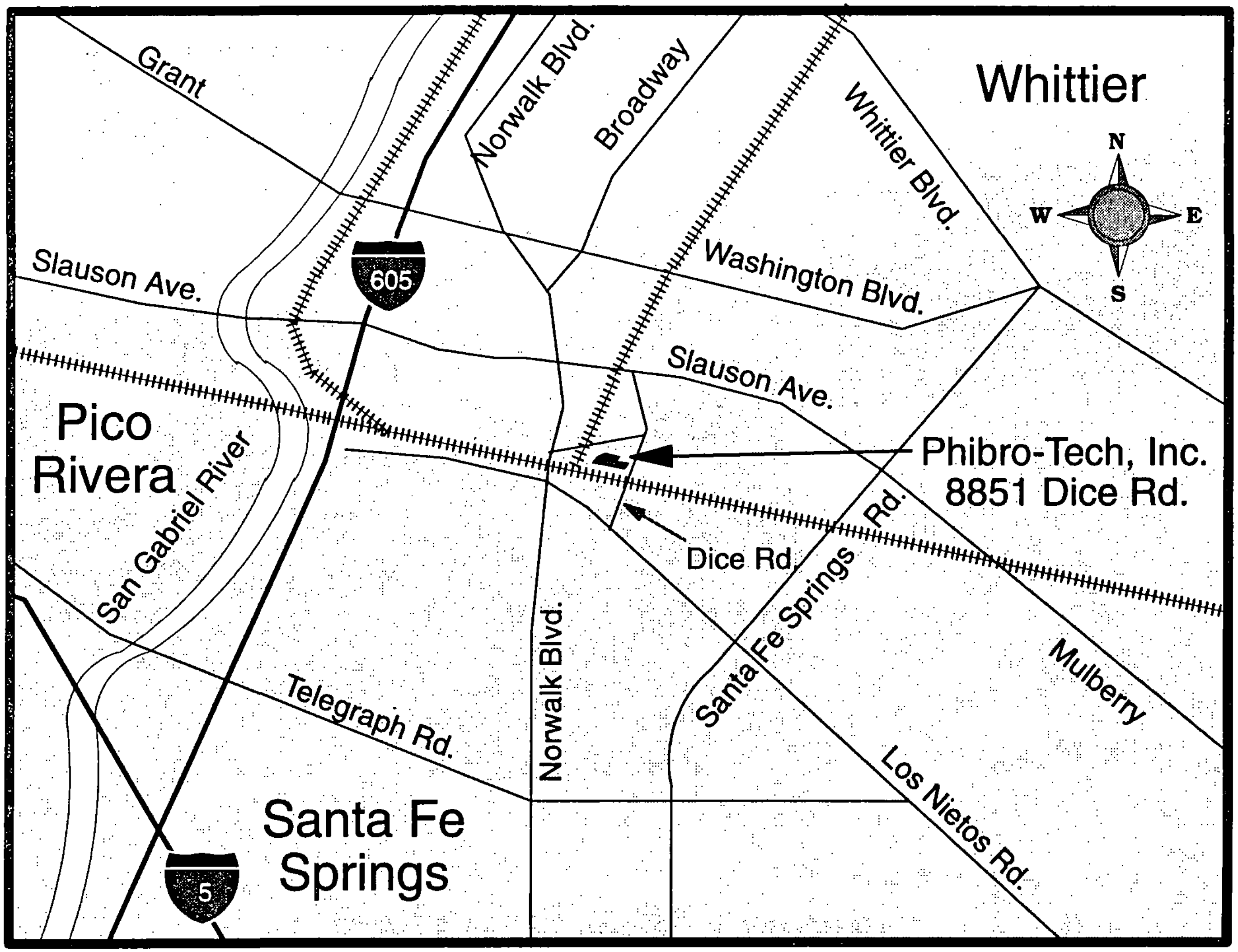
Well - A bored, drilled, or driven shaft whose purpose is to reach underground water supplies. In the case of the PTI facility, there are three types of wells in the area; supply wells which are used to supply drinking water and industrial water, monitoring wells which are used for gathering samples in order to detect and evaluate ground water pollution, and extraction wells which are used to remove contaminated ground water from the aquifer.

Attachments

Attachment 1

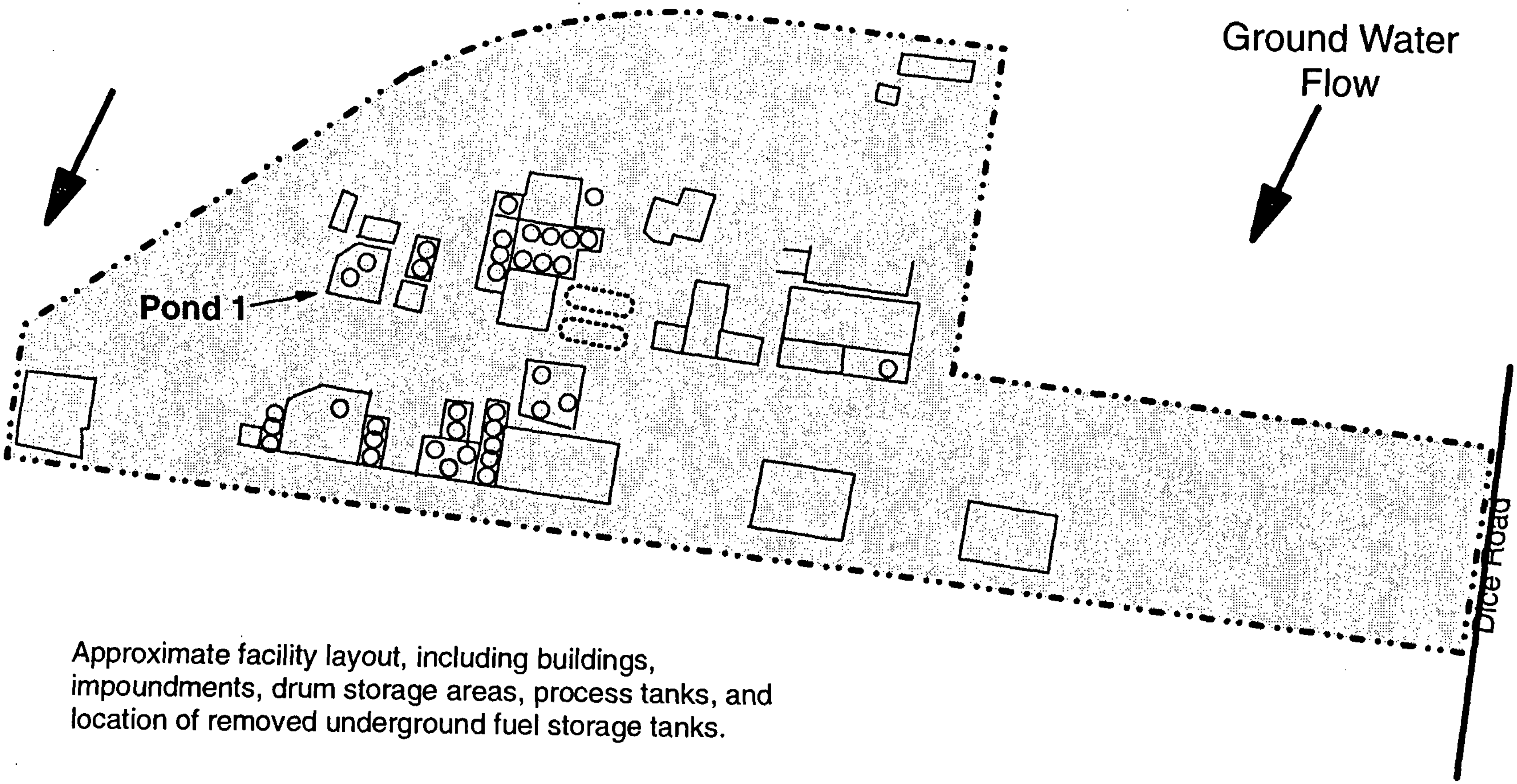
Site Location Map

Phibro-Tech, Inc., Santa Fe Springs, California



Attachment 2

Phibro-Tech, Inc.
Santa Fe Springs, California



Approximate facility layout, including buildings, impoundments, drum storage areas, process tanks, and location of removed underground fuel storage tanks.

Not to scale.

TABLE OF KEY CONSTITUENTS IN SHALLOW GROUNDWATER AT THE PHIBRO-TECH, INC. FACILITY													
CONSTITUENT	HIGHEST CONCEN-TRATION DETECTED DURING 7/93 (ug/l)	WELL WITH HIGHEST DETECT 7/93	HIGHEST CONCEN-TRATION DETECTED DURING 10/93 (ug/l)	WELL WITH HIGHEST DETECT 10/93	HIGHEST CONCEN-TRATION DETECTED DURING 1/94 (ug/l)	WELL WITH HIGHEST DETECT 1/94	HIGHEST CONCEN-TRATION DETECTED DURING 4/94 (ug/l)	WELL WITH HIGHEST DETECT 4/94	HIGHEST CONCEN-TRATION DETECTED DURING 7/94	WELL WITH HIGHEST DETECT 7/94	FEDERAL MCL (ug/l)	CALIF. MCL (ug/l)
CADMIUM & CHROMIUM												
Cadmium	200	4	710	4	230	4	330	4	200	4	5	10
Hexavalent Chromium	21,000	4	35,500 99,200 Dup	4	360	4	26,900	4	59,000	4	100	50
Chromium (total)	23,200	4	80,300	4	36,000	4	26,400	4	41,400	4	100	50
BTEX												
Benzene	0.6	4	1.3	4	0.81	4	ND500	9	0.88	7	5	1
Toluene	ND100	16	ND10	16	48	9	17,000	9	56,000	9	1,000	UR
Ethylbenzene	3,100	16	340	16	1,000	16	12,000	9	15,000	9	700	680
Xylenes (total)	2,000	16	45	9	220	9	32,000	9	40,000	9	10,000	1,750
HALOGENATED VOCS												
Trichloroethene (TCE)	1,100	9	390	9	230	9	270	9	340	4	5	5
1,1-Dichloroethene	300	9	120	9	91	9	71	9	59	4	7	6
Trans-1,2-Dichloroethene	93	9	ND10	9	ND10	9	ND5	9	ND10	4	100	10
1,2-Dichloroethane (1,2-DCA)	19	13S	71	13S	15	16	21	9	23	16	5	0.5

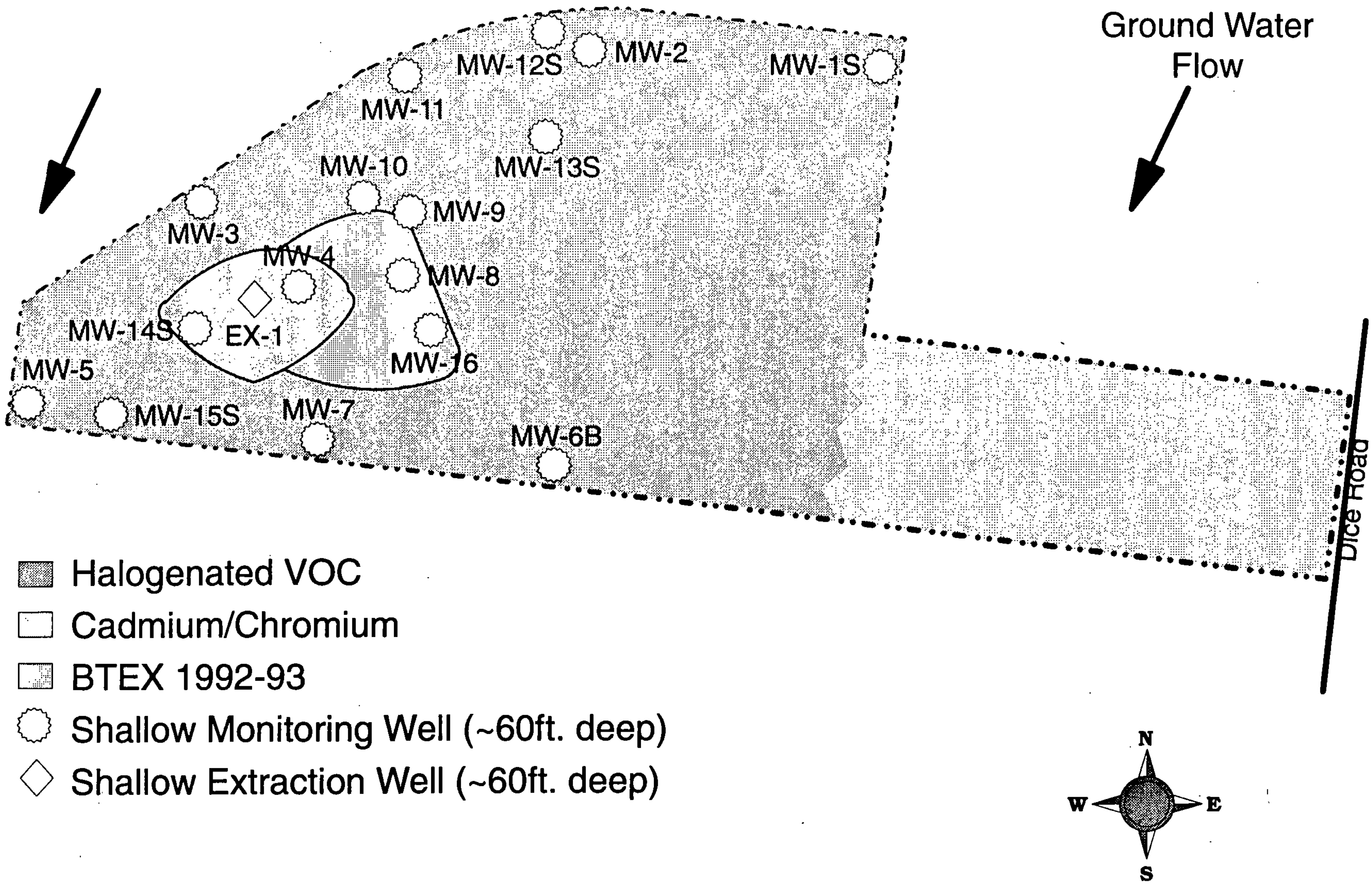
UR - unregulated
ug/l - micrograms per liter
ND10 - not detected at 10 ug/l
Dup - duplicate
MCL - maximium contaminant level

Attachment 3

Attachment 4

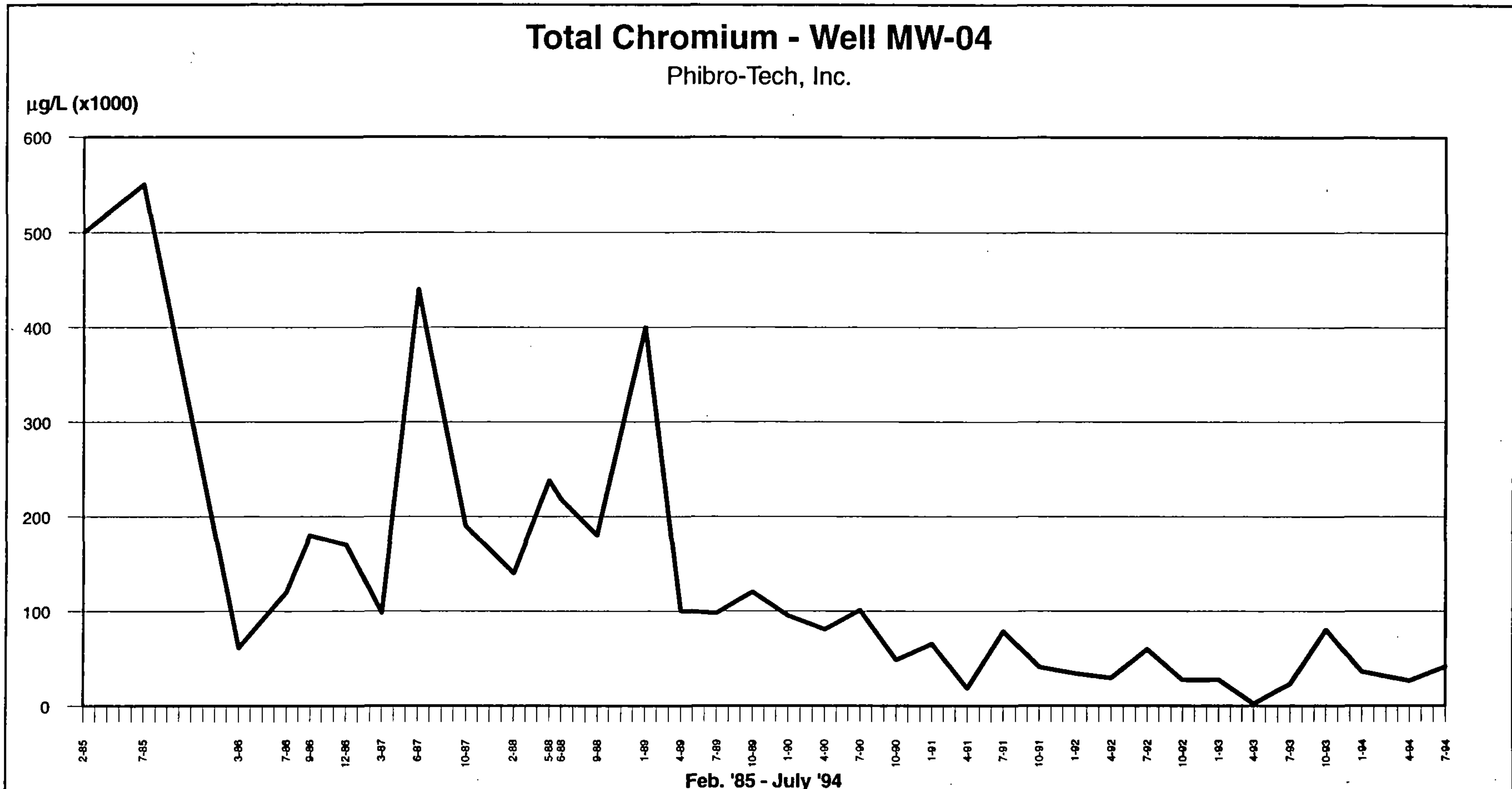
Shallow Groundwater Contamination

Phibro-Tech, Inc.



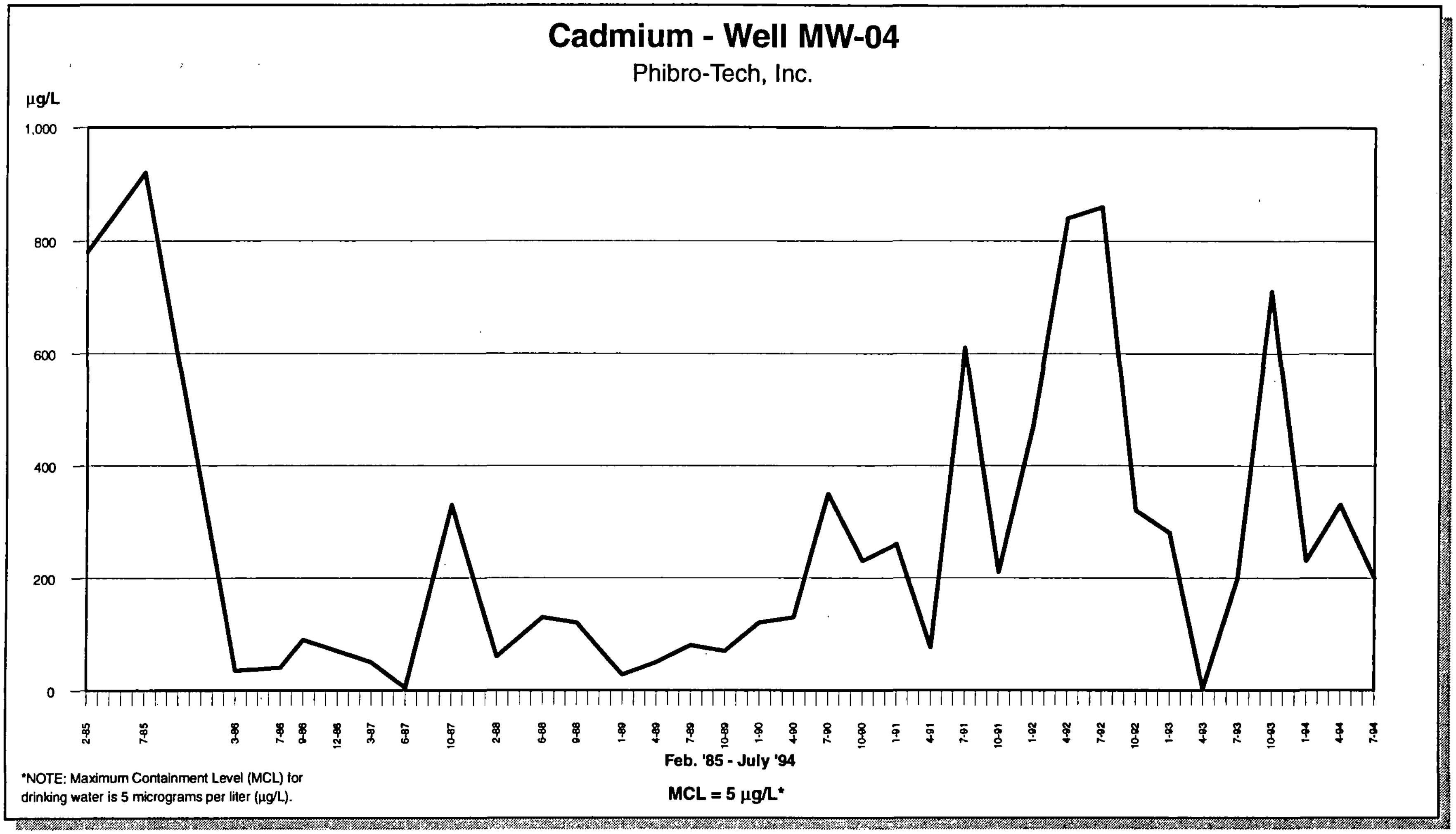
Not to scale.

Attachment 5



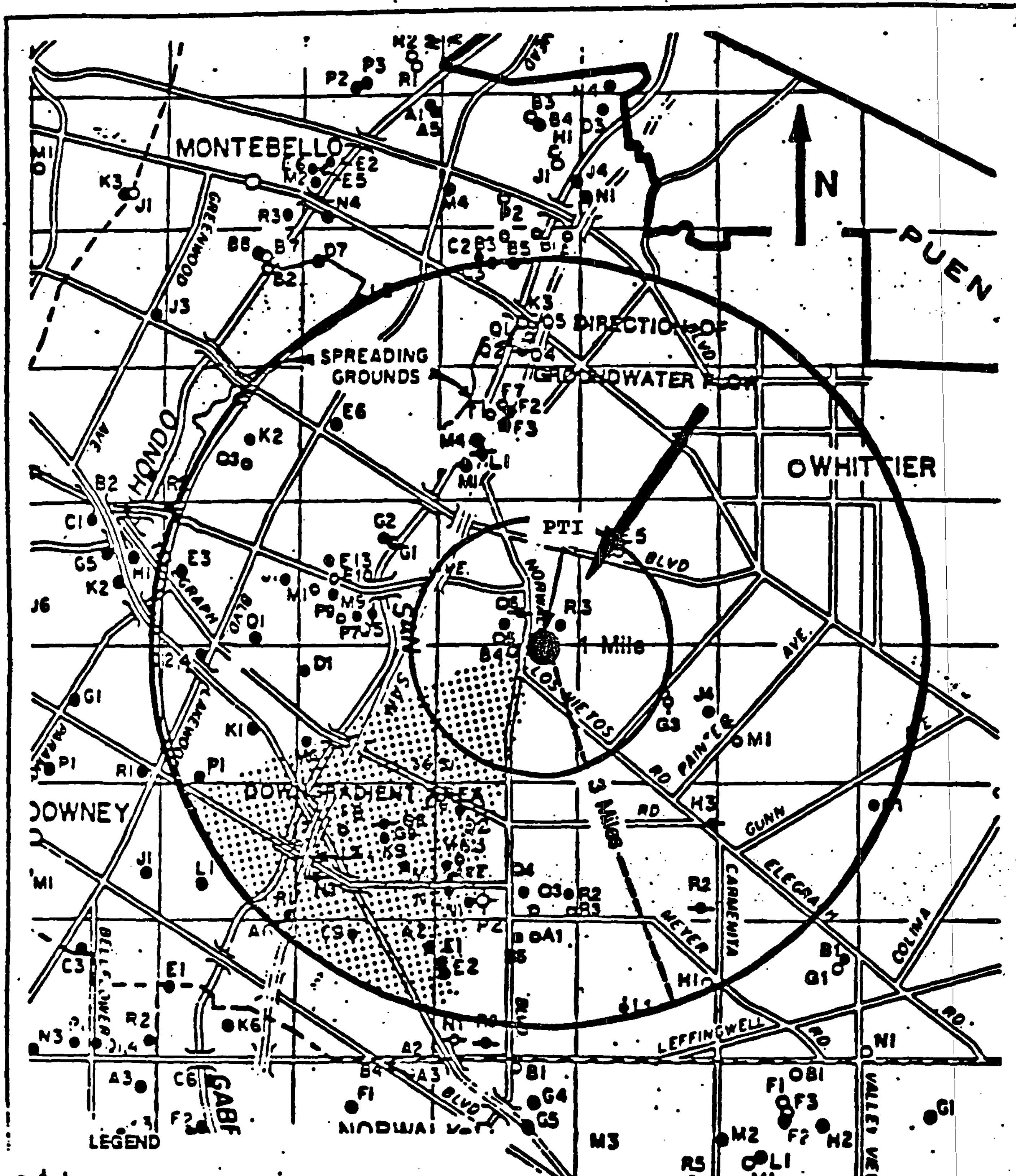
*NOTE: Maximum Containment Level (MCL) for drinking water is 50 micrograms per liter (µg/L).

Attachment 6



ATTACHMENT 7

WELL LOCATION MAP



LEGEND

- ACTIVE WELLS
- INACTIVE WELLS
- CAPPED, ABANDONED WELL

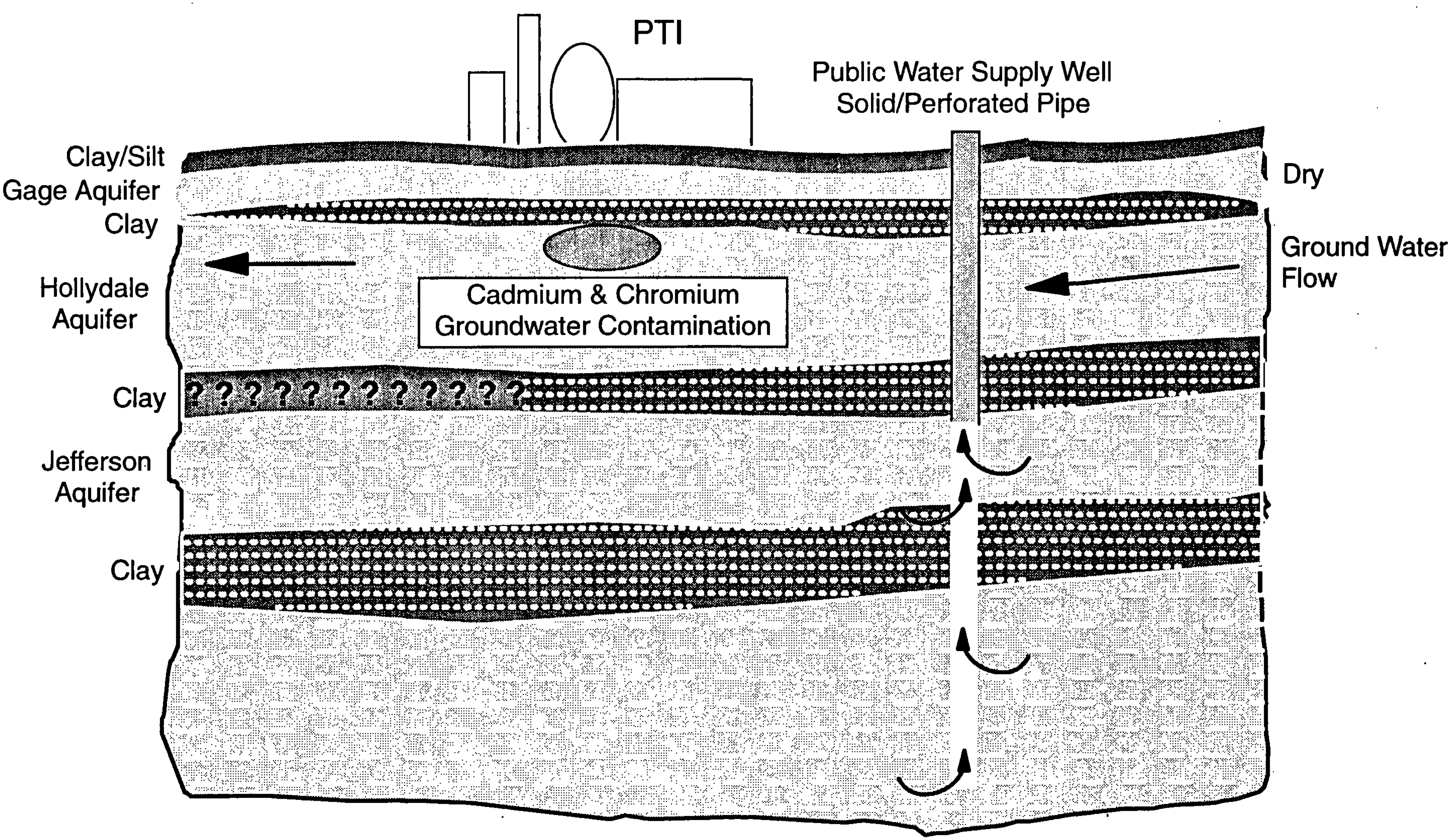
SCALE: 1" = 5660'

Adapted from Department of Water Resources Southern District Central Basin Watermaster Service Maps, 1980 & 1990.

PHIBRO-TECH, INC.

Attachment 8

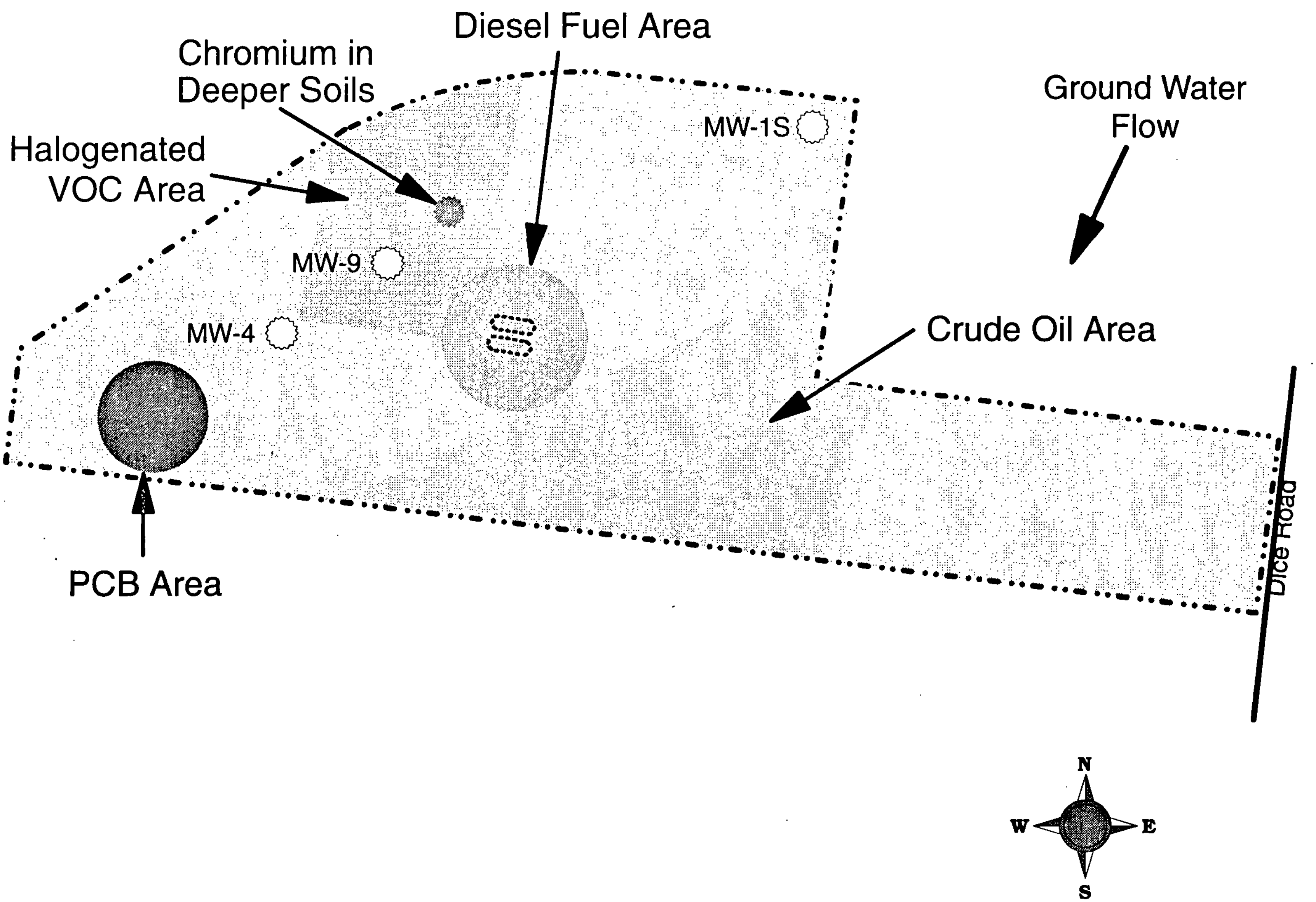
Ground Water System
Phibro-Tech, Inc.



Not to scale.

Attachment 9

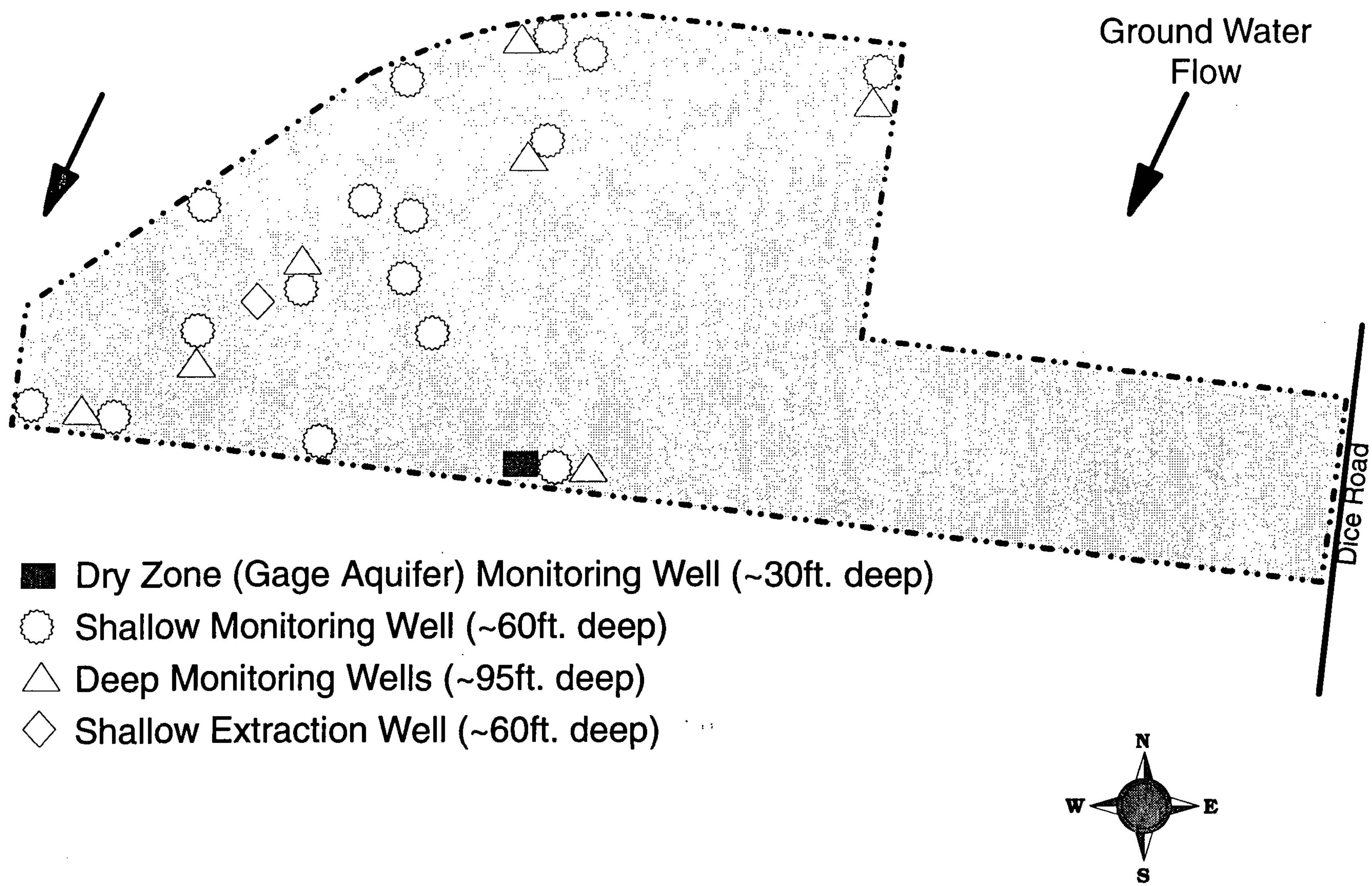
Soil Contamination Areas
Phibro-Tech, Inc.



Not to scale.

Attachment 10

Monitoring Wells
Phibro-Tech, Inc.



ATTACHMENT 11

LIST OF KEY DOCUMENTS

"Administrative Order on Consent", U.S. EPA Docket No. RCRA-09-89-001, December 8, 1988.

"Workplan, RCRA Facility Investigation, Southern California Chemical", June 8, 1990, Revised June 26, 1990.

"Current Conditions Report, RCRA Facility Investigation, Southern California Chemical," June 8, 1990.

"Pre-Investigation Evaluation of Corrective Measures, RCRA Facility Investigation, Southern California Chemical," June 8, 1990.

"RCRA Facility Investigation Phase I Report, Southern California Chemical, Santa Fe Springs", December 6, 1991, Revised March 10, 1992 and May 29 1992.

"Phase II Investigation RFI Workplan Addendum, Southern California Chemical", February 13, 1992, Revised March 5, 1992.

"Workplan, RCRA Corrective Measures Study" Southern California Chemical, March 23, 1992.

"Workplan, RCRA Risk Assessment, Southern California Chemical," March 23, 1992.

"RCRA Facility Investigation Phase II Report, Southern California Chemical, Santa Fe Springs", April 23, 1993.

"RCRA Facility Investigation, Executive Summary, Southern California Chemical, Santa Fe Springs", April 23, 1993.

"RCRA Facility Risk Assessment Report, Southern California Chemical, Santa Fe Springs, California", April 23, 1993.

"Corrective Measures Study Report, CP Chemicals, Inc., Southern California Chemical", August 27, 1993.

ATTACHMENT 12

Recording Requested By:

When Recorded, Mall Certified Copy To:

Jose Kou
California EPA
Department of Toxic Substances Control, Region 3
1011 N. Grandview Avenue
Glendale, California 91201

NOTICE
TO RESTRICT USE OF PROPERTY

This Notice is made on the ________ day of __________, 1994, by ________________, who is the owner of record ("Owner") of certain property situated in the City of Santa Fe Springs, County of Los Angeles, State of California, described ln Exhibit "A" attached hereto and incorporated herein by this reference ("the Property"), with reference to the following facts:

A. This Property, as described in Exhibit "A", is the real property known as Phibro-Tech, Inc. (a.k.a. Southern California Chemical, a.k.a. Entech Recovery, Inc.) located at 8851 Dice Road, Santa Fe Springs, County of Los Angeles, California, contains hazardous substances.

B. The Property is located in an industrial area of the City of Santa Fe Springs and has been used for a railroad switching station, foundry casting facility and chemical manufacturing. Ground water in the present uppermost saturated zone beneath the Property, identified as the Hollydale Aquifer, contains elevated levels of: (1) heavy metals, including chromium and cadmium, (2) halogenated volatile organic compounds (VOCs), including trichloroethylene (TCE) and 1,2,-dichloroethane (1,2-DCA), (3) aromatic VOCs, including toluene, ethylbenzene and xylenes and (4) chlorides. The soils at the Property contain elevated levels of (1) heavy metals, including lead, cadmium, chromium, copper, and zinc, (2) halogenated VOC's, including TCE, 1,2-DCA and tetrachloroethene (PCE), (3) aromatic VOC's, including benzene, toluene, ethylbenzene and xylenes, (4) polychlorinated biphenyls (PCB's), (5) petroleum hydrocarbons, including diesel fuel, gasoline and an unidentified heavy hydrocarbon believed to be crude oil, and (6) chlorides. The contaminated soils extend throughout the Property and have been covered with paving.

C. The Owner desires and intends that in order to protect the present and future human health and environment, the Property shall be used in such a manner as to avoid potential harm to persons or property which may result from hazardous substances in the soil and ground water at the Property.

ARTICLE I

GENERAL PROVISIONS

1.01. Provisions to Run With the Land. This Notice sets forth protective provisions, restrictions, and conditions, (collectively referred to as "Restrictions"), upon and subject to which the Property and every portion thereof shall be improved, held, used, occupied, leased, sold, hypothecated, encumbered, or conveyed. Each and all of the Restrictions shall run with the land, and pass with each and every portion of the Property, and shall apply to and bind the respective successors in interest thereof. Each and all of the Restrictions are imposed upon the entire Property unless expressly stated as applicable to a specific portion of the Property. Each and all of the Restrictions are imposed pursuant to Sections 25355.5 and 25356.1 of the Health and Safety Code and run with the land pursuant to Section 25355.5. Each and all of the Restrictions are enforceable by the California EPA, Department of Toxic Substances Control and any and all successor agencies, if any, to the Department of Toxic Substances Control.

1.02 Concurrence of Owners Presumed. All purchasers, lessees, or possessors of any portion of the Property shall be deemed by their purchase, leasing, or possession of such Property, to be in accord with the foregoing and to agree for and among themselves, their heirs, successors, and assignees, and the agents, employees, and lessees of such owners, heirs, successors, and assignees, that the Restrictions as herein established must be adhered to for the benefit of future Owners and Occupants and that their interest in the Property shall be subject to the Restrictions contained herein.

1.03 Incorporation Into Deeds and Leases. Owner desires and covenants that the Restrictions set out herein shall be incorporated by reference in each and all deeds and leases of any portion of the Property.

ARTICLE II

DEFINITIONS

2.01 Department. "Department" shall mean the California Environmental Protection Agency, Department of Toxic Substances Control and shall include its successor agencies, if any.

2.02 Improvements. "Improvements" shall mean construction of any buildings, foundations, roads, driveways, tanks, or paved parking areas upon any portion of the Property.

2.03 Occupants. "Occupants" shall mean those persons entitled by ownership, leasehold, or other legal relationship to the exclusive right to occupy any portion of the Property.

2.04 Owner. "Owner" shall mean the owner or its successors in interest, including heirs, and assigns, who hold title to all or any portion of the Property.

ARTICLE III

DEVELOPMENT, USE, AND CONVEYANCE OF THE PROPERTY

3.01 Restrictions on Use. The Owner will restrict the use of the Property as follows:

A. The Property at 8851 Dice Road shall not be used for residences, hospitals, schools, day-care centers, parks, playgrounds and any permanently occupied human habitation, including but not limited to, hotels or motels which could be used as a residence for employees, unless the Owner can adequately demonstrate that such use will not endanger human health or the environment. The Owner must receive written permission from the Department, City of Santa Fe Springs Planning Department and the Los Angeles County Health Department prior to using any portion of the Property for any of the uses described in this paragraph.

B. No domestic use of the shallow ground water (Hollydale Aquifer) beneath the Property shall be allowed, unless the Owner can adequately demonstrate that the ground water meets applicable drinking water standards. The Owner must receive written permission from the Department, City of Santa Fe Springs Planning Department and Los Angeles County Health Department prior to using water from the Hollydale Aquifer (50 to 120 feet deep) for domestic purposes.

C. The Property shall remain fully paved for any commercial or industrial use, unless the Owner can adequately demonstrate to the Department that disturbance of the paving will not increase the risk to human health or the environment, or is necessary to reduce an imminent threat to human health or the environment. The Owner must receive written permission from the Department prior to removing any pavement.

D. The Owner shall ensure that any construction work on the Property reduce excavation and earth moving activities such that disturbance of contaminated soils are minimized. The Owner shall ensure that adequate health and safety plans are developed and followed during any construction activities involving excavation or earth moving such that workers are adequately protected from exposure to contaminated soils.

E. The Owner shall notify the Department in writing prior to excavating or removing any soils from the Property. The notice shall indicate the purpose of the excavation, state the approximate volume of soil to be excavated, describe how the excavated soil will be managed, indicate how long excavated soils will be piled on the Property, indicate what analytical testing will be performed on the excavated soil and include an appropriately scaled map showing the location of the proposed excavation and where excavated soils will be piled. At a minimium, the Owner shall perform analytical tests on any excavated soil that will be removed from the Property and determine if the soil is a hazardous waste. Any material that is a hazardous waste shall be managed as such by following the applicable Department regulations. Excavated soils shall be managed in a manner that is protective of human health or the environment.

The Owner must receive written permission from the Department prior to excavating or removing any soils from the Property, unless the Owner can adequately demonstrate to the Department that the evcavation and removal is necessary to reduce an imminent threat to human health or the environment. If the Department determines that immediate action is required, the Department may orally authorize the Owner to act prior to receiving written approval.

F. The Owner shall inspect and maintain the site cover (paving) in a manner that prevents infiltration of liquids into subsurface soils.

3.02 Conveyance of Property. The Owner shall provide a thirty (30) day advance notice to the Department of any sale, lease, or other conveyance of the Property or an interest in the Property to a third person. The Department shall not, by reason of this Notice, have authority to approve, disapprove, or otherwise affect any sale, lease, or other conveyance of the Property except as otherwise provided by law or by an administrative order.

3.03 Enforcement. Failure of the Owner to comply with any of the requirements, as set forth in paragraph 3.01, shall be grounds for the Department to require that the Owner modify or remove any Improvements constructed in violation of this Notice. Violation of this Notice shall be grounds for the Department to file civil and criminal actions against the Owner as provided by law.

3.04 Notice in Agreements. All Owners and Occupants shall execute a written instrument which shall accompany all purchase, lease, sublease, or rental agreements relating to the Property. The instrument shall contain the following statement:

> "The land described herein contains hazardous substances. Such condition renders the land and the owner, lessee, or other possessor of the land subject to the requirements, restrictions, provisions, and liabilities contained in Chapters 6.5 and Chapter 6.8 of Division 20 of the Health and Safety Code. This statement is not a declaration that a hazard exists".

ARTICLE IV

VARIANCE AND TERMINATION

4.01 Variance. Any Owner or, with the Owner's consent, any occupant of the Property or any portion thereof may apply to the Department for a written variance from the provisions of this Notice. Such application shall be made in accordance with Section 25233, Health and Safety Code.

4.02 Termination. Any Owner or, with the Owner's consent, any Occupant of the Property or a portion thereof may apply to the Department for a termination of the restrictions contained in this Notice as they apply to all or any portion of the Property. Such application shall be made in accordance with Section 25234, Health and Safety Code.

4.03 Term. Unless terminated in accordance with paragraph 4.02 above, by law or otherwise, this Notice shall continue in effect in perpetuity.

ARTICLE V

MISCELLANEOUS

5.01 No Dedication Intended. Nothing set forth herein shall be construed to be a gift or dedication, or offer of a gift or dedication, of the Property or any portion thereof to the general public or for any purposes whatsoever.

5.02 Notices. Whenever any person shall desire to give or serve any notice, demand, or other communication with respect to this Notice, each such notice, demand, or other communication shall be in writing and shall be deemed effective [1] when delivered, if personally delivered to the person being served or to an officer of a corporate party being served or official of a government agency being served, or [2] three (3) business days after deposit in the mail if mailed by United States mail, postage paid certified, return receipt requested:

To: Owner [cite name and address below]

Copy to:

Chief, Facility Management Branch
California EPA
Department of Toxic Substances Control, Region 3
1011 N. Grandview Avenue
Glendale, California 91201

5.03 Partial Invalidity. If any portion of this Notice is determined to be invalid for any reason, the remaining portion shall remain in full force and effect as if such invalid portion had not been included herein.

5.04 Article Headings. Headings at the beginning of each numbered article of this Notice are solely for the convenience of the reader and are not a part of the Notice.

5.05 Recordation. This instrument shall be executed by the Owner. This instrument shall be recorded by the Owner in the County of Los Angeles within fourteen (14) days from the effective date of the permit modification for the state hazardous waste management permit (State Hazardous Waste Permit No. 91-3-TS-002).

5.06 References. All references to Code sections include successor provisions.

IN WITNESS WHEREOF, the Owner executes this Notice as of the date set forth below.

OWNER

Company Name: ______________________________

____

By: ______________________________

Title: ______________________________

Date: ______________________________

EXHIBIT "A"

PROPERTY DESCRIPTION AND FACILITY LOCATION MAP

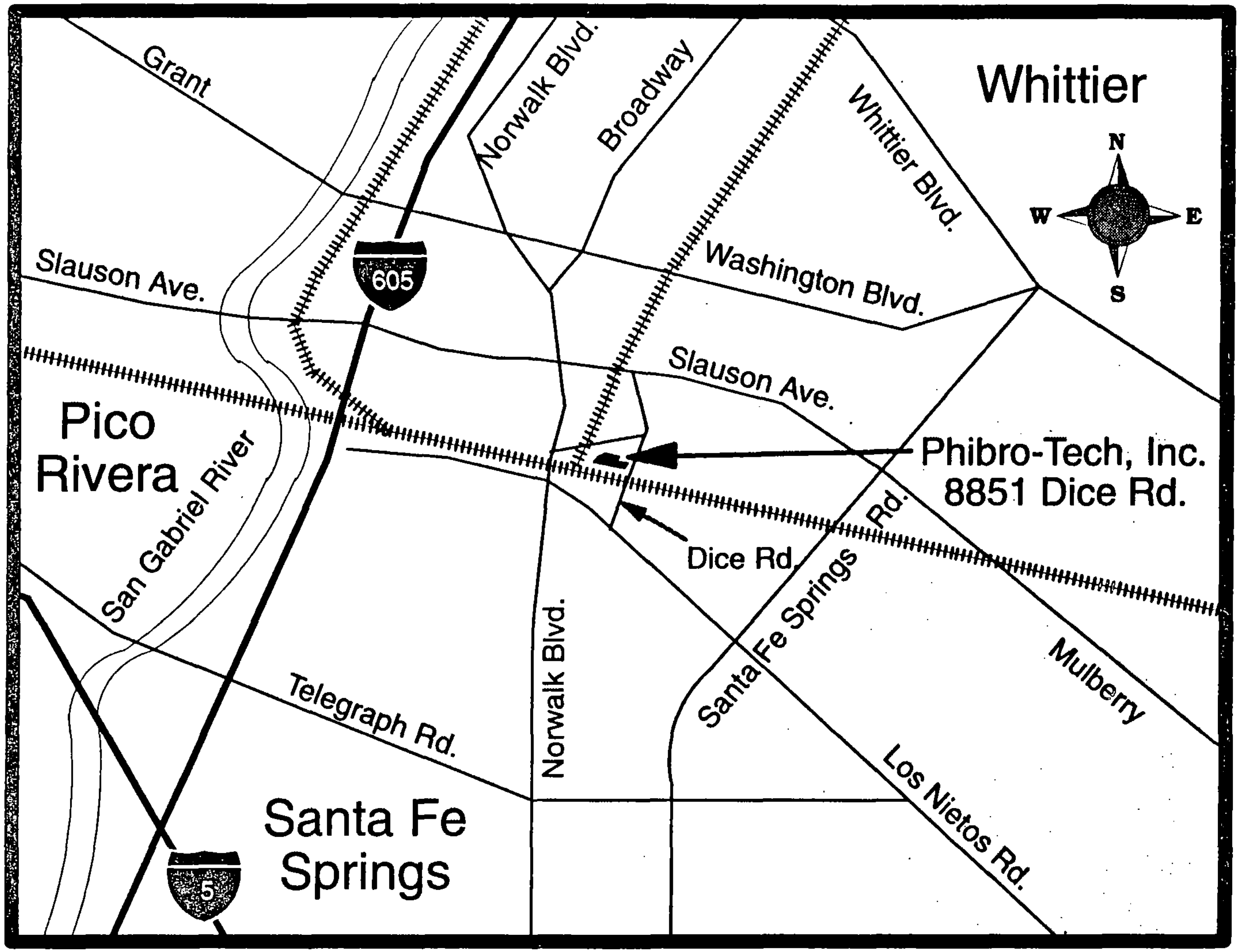
The property referred to in this Notice is situated in the County of Los Angeles, State of California, and is described as follows:

Parcel 1 of Parcel Map 16589, as per map thereof, recorded in Book 181 of Maps, Page 76, in the Office of the County Recorder of Los Angeles County.

Also, that portion of Dice Road as shown on Parcel Map No. 16589, in the City of Santa Fe Springs, County of Los Angeles, State of California, filed in Book 181, Page 76 of Parcel Maps, in the Office of the County Recorder of said county as described in the deed to the City of Santa Fe Springs, recorded July 26, 1968, as instrument No. 2723 of official records of said county bounded in the north by the easterly prolongation of that certain course in the northerly boundary of said Parcel Map No. 16589 as having a bearing and length of "north 78 degrees 35 minutes 00 seconds west 349.97 and bounded on the south by the easterly prolongation of the southerly line of said Parcel Map No. 16589."

Site Location Map

Phibro-Tech, Inc., Santa Fe Springs, California



ATTACHMENT 13

SOIL CLEANUP OPTION 6 COST ESTIMATE

STATEMENT OF BASIS FOR REMEDY SELECTION
PHIBRO-TECH, INC.

TOTAL CAPITAL COSTS - SOIL VAPOR EXTRACTION COMPONENT

A. Direct Capital Costs

Cost Component	Unit	Quantity	Unit Cost	Capital Cost
Installation of 4 Extraction Wells and 3 Vent Wells	Each	7	$4,000	$28,000
SVE System Piping	Feet	600	$5	$3,000
SVE System Fittings	Lump Sum	1	$1,500	$1,500
Blower	Each	1	$5,500	$5,500
Air/Water Separator	Each	1	$2,000	$2,000
Equip. Install.	Each	1	$1,800	$1,800
			Total Direct Capital Costs:	$41,800

B. Indirect Capital Costs (% of Direct Capital Costs)

Engineering and Design (15%)	$6,270
Contingency Allowance (25%)	$10,450
Other Indirect Costs	
Legal (5%)	$2,090
Regulatory (5%)	$2,090
Mobilization/Demobilization (10%)	$4,180
Total Indirect Capital Costs:	$25,080

C. Total Capital Costs

Total Direct Capital Costs + Total Indirect Capital Costs = Total Capital Costs

$41,800 + 25,080 = $66,880

TOTAL ANNUAL COSTS - SOIL VAPOR EXTRACTION COMPONENT

A. Direct Annual Costs

Component	Unit	Freq.	Annual Quantity	Unit Cost	Direct Annual Cost	Life of Item (Years)	Present* Worth Annual Cost
SVE O&M	Each	Annual	1	$15,400	$15,400	2	$27,100
Carbon Canister	Each	Quarter	4	$4,400	$17,600	2	$31,000

Total Direct Annual Costs: $33,000

Total Present Worth of Direct Annual Costs: $58,100

B. Indirect Annual Costs (% of Direct Annual Costs)

Administration (10%) $3,300 $5,800

Contingency Allowance (25%) $8,250 $14,500

Total Present Worth of Indirect Annual Costs: $20,300

C. Total Annual Capital Costs

Total Present Worth of Direct Annual Costs +
Total Present Worth of Indirect Annual Costs =
Total Annual Capital Costs

$58,100 + $20,300 = $78,400

* Assumptions: 9% Discount Rate and 2 Year Operation Period

D. Total Present Worth Costs (Capital & Annual) - Soil Vapor Extraction Component

$66,880 + 78,400 = $145,280

TOTAL PRESENT WORTH COSTS FOR SOIL CLEANUP OPTION 6

Total Present Worth Costs for Soil Option 3 +
Total Present Worth Costs for Soil Vapor Extraction +
Present Worth Installation Costs for 30 Vadose Zone Monitoring Points =
Total Present Worth Costs for Soil Option 6

$303,300 + $145,280 + 45,000 = $493,580

Final
Signed 9/30/88
effective date

ATTACHMENT 14

MODIFIED CLOSURE/POST-CLOSURE PLAN

FOR

SOUTHERN CALIFORNIA CHEMICAL

8851 Dice Road
Santa Fe Springs, CA 90670

INTRODUCTION

A revised Hazardous Waste Facility Closure Plan for Southern California Chemical (SCC), submitted on June 29, 1988, has been modified by the United States Environmental Protection Agency (EPA), Region IX and by the California Department of Health Services (DHS), in accordance with section 265.112(d)(4), Title 40, Code of Federal Regulations (40 CFR) and section 67212 (f) of the California Code of Regulations, Title 22, Division 4, Chapter 30, (Title 22). This modified Closure Plan shall be the approved plan which SCC must implement to properly close their hazardous waste management facility, listed as Pond #1. A brief explanation of why each section of the revised plan was modified is found at the beginning of each modified section. Missing components of a RCRA Closure Plan are identified and underlined in each modified section.

The activities in this modified Closure Plan are to be conducted in concert with the overall facility investigation at SCC specified by the final "Administrative Order on Consent" (3008(h) ORDER) issued by EPA pursuant to section 3008(h) of the Resource Conservation and Recovery Act (RCRA). In any event where there is conflict between activities of the modified Closure Plan and the Order, the Order shall take precedence unless EPA and DHS determine otherwise.

Listed below are documents which shall be considered part of the modified Closure Plan by reference. These documents provide necessary background and supporting information for implementation of the plan. The complete title and name of the author of the document is listed with the common name or acronym by which each document shall be referred to throughout the modified Closure Plan.

Reference 1: <u>RFA REPORT</u>

RCRA Facility Assessment Report, Southern California Chemical; A.T. Kearney & Science Applications International Corporation, September 1987.

Reference 2: <u>CME REPORT</u>

Comprehensive Groundwater Monitoring Evaluation of Southern California Chemical Company; Regional Water Quality Control Board (Region 4, Los Angeles), June 3, 1988.

Reference 3: <u>SCC PLAN</u>

Closure/Post-Closure Plan, Pond Number One; Southern California Chemical Company, June 29, 1988.

Reference 4: <u>3008(h) ORDER</u>

Final Administrative Order on Consent [pursuant to section 3008(h) of the Resource Conservation and Recovery Act]; United States Environmental Protection Agency, Region IX.

Reference 5: <u>HAR</u>

Hydrogeologic Assessment [Report] of Pond Number 1, Southern California Chemical; J.H. Kleinfelder & Associates, October 1985.

TABLE OF CONTENTS

I. FACILITY DESCRIPTION

Owner/Operator Name:	Southern California Chemical, A Division of CP Chemicals, Inc.
EPA Facility ID #:	CAD 008 488 025
Facility Address:	8851 Dice Road Santa Fe Springs, CA 90670-0118
Mailing Address:	Same
Facility Contact:	Milt Giorgetta, Plant Manager
Phone Number:	(213) 638-8036

Southern California Chemical (SCC) is an inorganic chemical manufacturer and spent material recycler (SIC Code 2819) located in an industrialized area of Santa Fe Springs, California. The facility has been in operation on the 3.4 acre site since 1959. Since 1984, the facility has been owned and operated by CP Chemicals, Incorporated of Fort Lee, New Jersey. SCC's current business entails the manufacture of inorganic solutions such as ferric chloride, copper sulfate, copper oxide, and ammonia-based metal etchants. These materials are returned to SCC in spent condition for recycling from the original customers. Other compatible waste streams such as acids, alkaline solutions, and metal-bearing solutions are also accepted for treatment or recycling. SCC is currently operating under interim status, which was granted to the facility on December 16, 1981. SCC intends to submit a RCRA Part B application prior to November 8, 1988.

<u>No topographic map was included with the SCC Closure Plan, and no other reference document includes one.</u> This information shall be provided by SCC in the revised Facility Description to be submitted to DHS and EPA.

<u>No listing of all other Hazardous Waste Management Units and their wastestreams was provided with the SCC Closure Plan.</u> This information shall be provided by SCC in detail in the revised Facility Description to be submitted to DHS and EPA.

<u>No Hydrogeologic background information was provided with the SCC Closure Plan.</u> This information shall be provided by SCC in detail in the revised Facility Description to be submitted to DHS and EPA.

No corrective action for groundwater or the groundwater monitoring system was provided with the SCC Closure Plan. This information shall be provided by SCC in detail in the revised Facility Description to be submitted to DHS and EPA.

SURFACE IMPOUNDMENT DESCRIPTION

The hazardous waste management unit to be closed is a concrete lined surface impoundment commonly known as Pond #1. Pond #1 was constructed in 1975 by modifying the former zinc pond (Pond #8). The Pond #1 construction consisted of relining Pond #8 with a 6" thick layer of reinforced concrete and extending the height of it's walls. The structure is 37' x 37' x 3' deep with 1' of its depth below grade and 2' above grade. Pond #1 is located toward the northwest portion of the SCC facility and has a capacity of 36,000 gallons.

The pond was taken out of service in July 1985, in accordance with SCC's July 30, 1985 Closure Plan submittal. All liquids and sludges were removed and the unit was cleaned of any residual wastes. The inactive unit has since been used as a secondary containment structure for two 30,000 gallon wastewater treatment tanks. However, the 1985 closure plan had not been approved for by DHS or EPA before closure activities had been carried out by SCC, and a Closure Plan was again required by the DHS "Complaint For Administrative Penalties" and subsequent "Consent Order" effective on August 28, 1987.

No engineering drawings or schematics showing piping, discharge points, or line connections for Pond #1 were provided with the SCC Closure Plan. Any lines or equipment attached to Pond #1 which are still in use must be indicated. This information shall be provided by SCC in detail in the revised Facility Description to be submitted to DHS and EPA.

No information on maximum quantities of liquid wastes or sludges which were disposed of from Pond #1 was provided with the SCC Closure Plan. This information shall be provided by SCC in detail in the revised Facility Description to be submitted to DHS and EPA.

Pond #1 treated aqueous effluent resulting from on-site treatment processes, contaminated rainwater, drum rinsewater, and general facility wash water. However, records of all wastes which were specifically treated in this unit are unavailable. Typically, the treated effluent stream was of a high pH (10-14), and is believed to have contained varying concentrations of the following constituents (not all of which are hazardous):

CONSTITUENT	EPA WASTE CODE / CHARACTERISTIC
ammonium chloride	----
ammonium sulfate	----
copper	----
copper ammonium chloride	---- / toxic
arsenic	D004 / toxic
free ammonia	----
ammonium biflouride	---- / toxic, corrosive
cadmium	D006 / toxic
chromium (+3, +6)	D007 / toxic
ferrous hydroxide	----
iron	----
lead	D008 / toxic
nickel	----
nickel sulfate	---- / toxic
sodium chloride	----
sodium hydroxide	---- / toxic, corrosive
sodium sulfide	D003 / toxic, flammable

Acidic solutions, some containing varying concentrations of heavy metals, were also added to the effluent stream for neutralization.

Metals were removed by the addition of a reducing agent such as sodium sulfide. This material would form an insoluble metal sulfide compound and then precipitate from the solution. The resulting supernatant liquid at the surface of Pond #1 would then be filter pressed for removal of any suspended solids, polish filtered, and then discharged to the sanitary sewer via a three-stage clarifier. Precipitated sludges were periodically removed and transported to a Class I disposal site. Effluent discharge from Pond #1 was made under authorization of the Los Angeles County Sanitation District's Industrial Waste Discharge Permit No. 10342 and Addendum.

<u>No information on general site security or closure-specific site security was provided with the SCC Closure Plan.</u> This information shall be provided by SCC in detail in the revised Facility Description to be submitted to DHS and EPA.

<u>No liner or leachate collection systems design information for Pond #1 was provided with the SCC Closure Plan.</u> This information shall be provided by SCC in detail in the revised Facility Description to be submitted to DHS and EPA.

<u>No run-on or run-off control information for pond #1 was provided with the SCC Closure Plan.</u> This information shall be provided by SCC in detail in the revised Facility Description to be submitted to DHS and EPA.

All items which were not provided with the SCC Closure Plan must be provided in a detailed revised Facility Description which is to be submitted to DHS and EPA within 30 days of the modified Closure Plan approval.

II. CLOSURE PROCEDURES

The procedures in this section shall describe the steps SCC will take to properly close Pond #1 in a way that is consistent with the forthcoming overall facility investigation required by the 3008(h) order. This section was modified due to the issuance of the 3008(h) ORDER and comments by SCC requesting that closure activities be integrated with the 3008(h) ORDER.

GENERAL PROCEDURES

Since SCC depends heavily on the continued use of its wastewater treatment system to conduct normal operations, it has been determined that the two wastewater treatment tanks located in the unit must be relocated as part of closure. For this reason, the time necessary to complete closure activities will need to be extended in accordance with 40 CFR 265.113(b)(1)(ii)(C). The general closure procedures for Pond #1 shall be as follows:

- o Site Characterization/Tank Relocation Plan
- o Impoundment Characterization
- o Concrete and Soil Removal, Soil Stabilization
- o Interim Cover/Final Cover
- o Closure Certification
- o Post-Closure Care & Maintenance

SITE CHARACTERIZATION/TANK RELOCATION PLAN

The two (2) 30,000 gallon wastewater treatment tanks currently located in Pond #1 must be removed from the unit in order to proceed with soil sampling activities. However, due to the critical role they play in normal facility activities, they must remain in continuous service throughout closure of Pond #1. Therefore the tanks shall be relocated to accommodate this need prior to commencing sampling activities for Pond #1.

Information gathered from the HAR, the RFA REPORT, and the recent 3008(h) ORDER has indicated that soil contamination exists or is likely to exist in various areas throughout the SCC facility. To place the tanks over an already contaminated area would be counterproductive for SCC in light of forthcoming facility-wide corrective actions. For this reason, SCC shall develop a proposal for the tank relocation phase of the closure. The Tank Relocation Plan must be submitted to DHS and EPA within 60 days after the modified Closure Plan approval. The Tank Relocation plan shall include the following:

1. Diagrams of at least three (3) proposed relocation areas.

   The diagrams (drawings, sketches, or photographs) shall show the dimensions of the proposed area, and its proximity to existing units, buildings, property lines, facility traffic routes, etc. Diagrams shall be drawn to scale with the scale and a north arrow indicated on them.

2. Summary of area history.

   Background information on each proposed area shall indicate known or suspected past as well as present activities. SCC will propose tank relocation areas which are known or expected to be free of contamination or can be easily decontaminated.

3. Sampling, Analysis, and Characterization Plan

   Each location must be characterized to determine the lateral and vertical extent of contamination, and types of contaminants present. A sampling and analysis protocol must be developed that is consistent with the requirements for Pond #1 (see "sampling and analysis plan" in section III). SCC must submit within 60 days after the modified Closure Plan approval the Sampling and Analysis Plans for tank relocation and Pond #1 closure as one plan to ensure consistency. This Sampling and Analysis Plan will be a subset of the plans required under the 3008(h) Order.

4. Secondary containment design

   Since the secondary containment design for the relocated tanks could vary based on location, the proposal shall outline the sizes, capacities, dimensions, construction methods and materials proposed for each proposed tank relocation area.

Once the proposal has been approved by the agencies, SCC shall begin sampling activities (see "Closure Schedule", section IV). When sampling and analysis activities have been completed, SCC shall prepare a report which indicates which area is best suited for the tank relocation based on analysis results. This report shall include laboratory data, diagrams of contaminated zones (lateral and vertical extent), and discuss remediation alternatives if necessary and their feasibility for each area.

Soil in the proposed tank areas, if contaminated, shall be cleaned up to meet EPA-established preliminary cleanup performance standards.

The preliminary cleanup performance standards for soil shall be based on EPA-established exposure limit criteria as follows:

Trivalent Chromium (Cr +3)	1000 mg/kg
Hexavalent Chromium (Cr +6)	6 mg/kg
Cadmium	9 mg/kg
All other contaminants from Priority Pollutants List in 40 CFR Part 423 and Xylene	Non-detectable

In anticipation of a relocation area approval, SCC shall secure necessary permits and authorizations from local agencies which are also involved in environmental compliance. SCC shall also submit a revised Part A Application to DHS and EPA as part of the approval request for tank relocation (see "Closure Schedule"). The tanks shall be relocated and operational within 365 days from the modified Closure Plan approval (see schedule).

IMPOUNDMENT CHARACTERIZATION

The site characterization portion of this modification is focused at Pond #1, and the soil immediately around and beneath it. This is required in accordance with 40 CFR 265.112(b)(4). This section has been modified due to a lack of detail and ambiguous wording in some portions of the SCC plan.

The primary intent of the characterization for the unit is to determine:

1) the horizontal and vertical extent of soil contamination existing as a result of past operation of the unit;

2) the types and levels of contamination found so as to provide reference information for Post-Closure groundwater monitoring activities.

A characterization report shall be developed to include: sampling and analysis QA/QC documentation, soil boring logs, analysis results, discussion of results, diagrams showing zones of contamination (lateral and vertical extent) in the sampling locations, documentation of any unusual conditions or events which impact sampling activities, and amount of soil to be removed. Also, a discussion on proposed corrective action for the area shall be included with the report. This discussion shall provide detail on procedures for concrete and soil removal (see next section).

The constituents to be analyzed for are listed in the section entitled "Sampling and Analysis Plan" of section III. The characterization report is to be submitted to DHS and EPA within 425 days of the modified Closure Plan approval.

CONCRETE & SOIL REMOVAL, SOIL STABILIZATION

The concrete structure shall be broken up, removed, and disposed of as hazardous waste.

The actual amount of soil to be removed shall depend upon the extent of soil contamination observed, and the feasibility of the removal activities. SCC shall include this information in the characterization report. The soil removal activities must be approved by DHS and EPA prior to constructing the interim cover. The soil removed shall also be disposed of as hazardous waste, unless analysis shows otherwise. Proposed disposal locations shall be indicated in the report.

The remaining contaminated soil shall be stabilized to a bearing capacity sufficient to support the interim cover in accordance with 40 CFR 265.228(a)(2)(ii).

INTERIM COVER/FINAL COVER

Within 470 days of the modified Closure Plan approval for Pond #1, construction of the interim cover shall commence over the contaminated soil which was left in place. This cover shall be constructed of an impermeable material which will prevent the infiltration of liquids into the contaminated area. It shall be graded or paved to prevent the accumulation of standing liquids. Interim cover design and construction plans shall be submitted to DHS and EPA within 425 days after approval of the modified Closure Plan as part of the site characterization report. DHS and EPA will review and modify or approve this plan prior to implementation.

Guidance for developing the interim cover may be obtained from the handbook entitled "Remedial Action at Waste Disposal Sites", EPA/625/6-85/006, October 1985.

SCC shall also provide design and construction plans for a final cover in accordance with 40 CFR 265.228(a)(2)(iii). Guidance for cover design can be found in EPA/600/2-87/039, "Design, Construction, and Maintenance of Cover Systems for Hazardous Waste", U.S. Army Engineer Waterways Experiment Station, May, 1987. Any requirements for a final cover will be made a part of the overall SCC facility corrective action activities. Final cover design and construction plans will be submitted in accordance with the schedule set forth in the 3008(h) Order.

The design and construction of the final cover must comply with the requirements of the following:

- 40 CFR 265.228(a)(2)(iii);
- Title 22, California Code of Regulations, Section 67316(b)(3);
- Title 23, California Code of Regulations, Section 2581(a).

Within 60 days after completion of the interim cover construction, the owner/operator and an independent registered professional engineer in California shall certify the completion of interim closure activities.

CLOSURE CERTIFICATION

All closure activities shall be certified by the owner/operator (SCC) and an independent registered professional engineer in California within 60 days of closure completion as specified by the 3008(h) Order. This is in conformance with the requirements of 40 CFR Part 265.115.

POST-CLOSURE CARE & MAINTENANCE

Because of the known soil and groundwater contamination in the vicinity of the unit, closure with waste in place must follow the requirements for a hazardous waste landfill. It was necessary to modify this section because the SCC submittal lacked detail regarding major facets of Post-Closure including:

- Survey Plat (40 CFR 265.116)
- Post-Closure care (40 CFR 265.228, 265.310)
- Post-Closure use of property (40 CFR 265.117)
- Maintenance activities (40 CFR 265.228)
- Groundwater Monitoring (40 CFR 265 Subpart F)
- Post-Closure Plan (40 CFR 265.118)
- Post-Closure care period contact person/office (40 CFR 265.118)
- Post-Closure notices (40 CFR 265.119)
- Certification of Post-Closure completion (40 CFR 265.120)

The proposals in the SCC Plan to construct a combination secondary containment structure and cover system over the closed unit do not conform with design concepts currently accepted by EPA and DHS for covers. In addition to this, no supporting documentation has been provided to demonstrate the merit of this concept.

After the Closure activities are complete, the Post-Closure period will begin. During this period, inspection and maintenance of the cover and continuing groundwater monitoring will be required under Interim Status standards, 40 CFR 265.228(b), and 265.117-265.120. Similar California regulations are found in 22 CCR 67316(c) and 67288(m)-(s). In addition, the Post-Closure activities must comply with the State Water Resources Control Board regulations in Title 23, CCR, Article 5 (Water Quality Monitoring for Classified Waste Management Units). The owner and operator will be required to submit an application for a Post-Closure permit which will formalize the interim status standards into a site-specific permit.

In general, post-closure uses of the property on which hazardous wastes remain after closure are restricted to those which will not disturb the integrity of the final cover or the facility's monitoring systems. However, certain activities may be approved if they will not increase the hazard, or the potential hazard to human health or the environment, or it is necessary to reduce a threat to human health or the environment. Such a modification would be considered a major modification to the post-closure permit and would be subject to public review.

A complete, detailed Post-Closure Plan must be submitted to DHS and EPA by SCC in conjunction with requirements of the 3008(h) Order.

III. CLOSURE ACTIVITY PROTOCOL

PERSONNEL HEALTH & SAFETY PLAN

The contents of the facility Health and Safety Plan shall apply to all aspects of the closure from tank relocation to the interim cover construction. It shall focus on any areas, routes or locations on the facility where hazardous wastes generated from closure activities would be encountered. These will include, but not be limited to Pond #1, background sampling locations, equipment and personnel decontamination areas, and waste collection areas for onsite/offsite treatment and offsite disposal.

The Health & Safety Plan shall be submitted to DHS and EPA within 30 days of the modified Closure Plan Approval. Attached to this Closure Plan is a copy of "Appendix B. Generic Site Safety Plan" which delineates the requirements to be addressed in the Health & Safety Plan for the SCC facility closure.

SAMPLING & ANALYSIS PLAN FOR POND #1

Within 60 days of the Modified Closure Plan approval, SCC shall submit to DHS and EPA a detailed sampling location diagram with a complete Sampling and Analysis Plan for Pond #1. The diagram (drawn to scale) shall include the following:

o At least four (4) proposed sampling locations on the unit floor for taking vertical soil borings. These shall be located where cracks or other observable surface anomalies exist. The SCC Plan specified six because two of the concrete cores were to be used as concrete structural test samples. Since all the concrete shall be disposed of, the additional two are not required.

o Color photographs of the sampling locations shall be submitted with the diagram. They are to show the sampling locations clearly marked, and their locations in reference to each other and the tanks. Samples from each of the four soil borings shall be analyzed at depths of 1', 1.5', 2', 3', 5', and every 5' interval thereafter to a maximum depth of 40' or until groundwater is encountered, whichever happens first.

Vertical soil borings shall also be taken around the three accessible sides of the unit's perimeter to observe any potential lateral soil contamination from the unit. Nine (9) borings (3 on each side) as identified in the SCC Plan, figure 1 shall be made to obtain samples for analysis purposes. [note that the SCC Plan dated June 29 specified nine (9) sampling locations, while the intent of the May 30, DHS letter to SCC was three (3) sampling locations at a minimum. Upon obtaining clarification of this misunderstanding, SCC proposed three (3) sampling locations in the July 1, 1988 submittal. DHS and EPA have since determined that nine (9) perimeter sampling locations would be more appropriate for characterization purposes.]

The sampling depths for analysis around the unit shall be the same as those within the unit (1', 1.5', 2', 3', 5', etc.) Any concrete cores removed from the unit or perimeter to provide access to the soil shall be disposed of as a hazardous waste.

Due to the nature and variety of past waste management activities on the SCC site, there is reason to believe that it may be difficult to obtain representative background soil samples. In addition to the four (4) background sample locations proposed in the SCC Plan, fig. 2, two (2) offsite background sampling locations shall be proposed by SCC for a total of six (6) proposed background sampling locations. These proposed locations shall be submitted along with the sampling location diagram for the unit.

Background soil samples shall be analyzed at the following depths: 5', 15', 25' and 40'. Additional samples may be taken and preserved in the event that additional data is needed to adequately characterize the background. No soil samples for the background, perimeter, or unit shall be composited.

All samples taken shall be handled, preserved and analyzed according to all applicable protocols detailed in EPA document SW-846, Test Methods for Evaluating Solid Waste. The test methods shall be identified in the Sampling and Analysis Plan to be submitted within 60 days of approval of the modified Closure Plan. The sampling and analysis plan shall be approved or modified, if necessary, by both DHS and EPA prior to any soil boring activities taking place.

Drilling and Sampling Procedure

The 8" Diameter Hollow Stem Auger (HSA) equipment with the California Split-spoon sampler shall be used as specified in the SCC Plan sections on "Subsurface Investigation" and "Drilling... Procedure". This information shall be resubmitted to DHS and EPA as part of the Sampling and Analysis Plan which is due within 60 days of the modified Closure Plan approval.
Rinsewaters from decontamination of sampling equipment shall be managed as a hazardous waste and temporarily stored in drums or tanks until properly disposed of. These containers or tanks shall be clearly marked as hazardous waste. This information shall be submitted to DHS and EPA in the Facility Decontamination Plan which is due within 30 days of the modified Closure Plan approval.

Because of the unavailability of accurate wastestreams records for Pond #1, it will be necessary to analyze soil samples for the following constituents (Xylene and other organics from the priority pollutants listing were found in groundwater samples):

o 40 CFR Part 423, Appendix A-
 Priority Pollutants

o Constituents allegedly placed in Pond #1
 (numbers refer to Priority Pollutants).

ammonium chloride
ammonium sulfate
copper (#120)
copper ammonium chloride
arsenic (#115)
free ammonia
ammonium biflouride
cadmium (#118)
chromium (#119) [Cr +3 and Cr +6]
ferrous hydroxide
iron
lead (#122)
nickel (#124)
nickel sulfate
sodium chloride
sodium hydroxide
sodium sulfide

- Xylene
- soil pH

SCC shall analyze all samples (background, pond and pond perimeter) for the above listed constituents. However, SCC may propose a method in the Sampling and Analysis Plan which will reduce the above list of constituents into a more relevant list. A reduction of the constituents to be analyzed for must receive approval from DHS and EPA. EP Toxicity testing criteria shall be used for the heavy metals listed. SCC shall analyze the above listed compounds for their cation and anion species using methods outlined in SW-846, Test Methods for Evaluating Solid Waste as proposed in the comments submitted to DHS on August 28, 1988.

Should soil contamination of a non-uniform distribution be identified after these samples have been analyzed, SCC shall propose methods to better identify the "hot spots" (areas where levels of localized contamination are decidedly higher than in surrounding areas) and define the extent of contamination. These methods are subject to DHS and EPA review and modification or approval.

Immediately after the drilling and sampling activities are completed, the open boreholes (unit floor, perimeter, and background) shall be filled with a concrete grout or similar material. This material shall be capable of preventing any liquids entrance into the subsurface via the drilling/sampling locations.

Analysis Report

The analysis report shall be submitted to both DHS and EPA as soon as possible once analytical data has been generated from the lab, but not more than 425 days after the modified Closure Plan approval. The following items shall be included in the report:

- Soil boring logs (unit, perimeter, background)
- Soil analysis (unit, perimeter, background)
- Soil analysis summary
- Diagrams showing all sampling locations
- Details of sample identification/preservation
- Chain of custody records
- Extent of contamination
- Proposed amount of soil to be removed

FACILITY DECONTAMINATION PLAN

A decontamination area shall be identified and used for all aspects of the site characterization to prevent the inadvertent spreading of hazardous constituents and cross-contamination of drilling and sampling equipment. All rinsewaters from cleaning equipment shall be collected in a suitable container(s) and managed as hazardous waste. All contaminated clothing, rags, or other solid materials shall be placed in drums or a hazardous waste dumpster and managed in accordance with 40 CFR 265.170-177. The designated decontamination area shall be clearly marked.

A complete facility and equipment decontamination plan shall be submitted to DHS and EPA within 30 days of the approval of the modified Closure Plan. Guidance in developing the plan may be found in EPA/600/2-85/028, Guide for Decontaminating Buildings, Structures, and Equipment at Superfund Sites, March 1985. DHS and EPA must review and modify or approve this plan prior to implementation.

GROUNDWATER MONITORING PLAN

The SCC plan does not make reference to any ongoing groundwater monitoring activities. The recent Comprehensive Groundwater Monitoring Evaluation (CME) report by the California Regional Water Quality Control Board (CRWQCB) lists a number of potential deficiencies in the existing system which must be corrected by SCC.

The revised Groundwater Monitoring Plan shall be resubmitted to DHS, EPA, and the RWQCB as stipulated in the 3008(h) Order.

IV. CLOSURE SCHEDULE

SCC failed to submit a detailed schedule of activities for the closure of the unit. The schedule listed below is provided to show relevant milestones for major closure activities and a compliance schedule for the submittal of documents to DHS and EPA. SCC must submit within 30 days of after modified Closure Plan approval a detailed schedule for dates or time periods of specific closure activities, which includes but is not limited to background sampling, submittal of samples to lab, moving tanks, disposing of hazardous wastes, pouring concrete, etc.

ACTIVITY/ITEM	DAYS AFTER CP APPROVAL
SCC to submit the following: Detailed facility description, Facility Decontamination Plan, Health & Safety Plan, Closure Schedule.	within 30 days
SCC to submit the following: Tank Relocation Proposal, Sampling & Analysis Plan, Revised Cost Estimate for Closure.	within 60 days
SCC to submit evidence of Financial Responsibility compliance	within 90 days
SCC receives approval for and begins sampling activities for tank relocation.	within 105 days
SCC to submit the following: Report on tank relocation proposal activity, Revised Part A Application, Permit applications & other information to local agencies.	within 165 days
SCC receives approval of final tank relocation area.	within 210 days
SCC submits interim cap design for approval.	within 240 days
SCC receives approval of interim cap design.	within 300 days

SCC to complete construction of new tank area and begin operations; Begin characterization for Pond #1.	within 365 days
SCC submits characterization report for Pond #1, and corrective action proposal for approval.	within 425 days
SCC receives approval for proposed corrective action, and begins implementation.	within 470 days
Complete interim cover construction.	within 560 days
Certification of interim closure.	within 620 days

V. CLOSURE AND POST-CLOSURE COST ESTIMATES

The proposed closure and post-closure cost estimates submitted by the facility in the SCC Plan were not detailed and it is not known if these figures reflect the "worst-case" closure scenario. SCC shall submit revised detailed cost estimates to reflect the activities specified in this modification to the agencies within 60 days of the modified Closure Plan approval. Closure cost estimates shall include activities from tank relocation to certification as shown in the above schedule. Cost estimates shall be based on all closure work being done by a third party.

VI. FINANCIAL RESPONSIBILITY

SCC shall demonstrate compliance with 40 CFR sections 265.143, 265.147, 265.148, and 264.151 as well as Title 22, Article 17, CCR, financial responsibility, within 30 days of the revised closure cost estimate submittal and within 30 days of any further revision to the estimates.

If SCC can not provide proof of liability coverage, a written report will be submitted to the DHS Financial Responsibility Unit on a quarterly basis. This report is due on the 10th day of every third month following the date of the modified Closure Plan approval. This report shall include, but need not be limited to:

1. The current financial statement(s) of any company and/ or parent corporations which demonstrates to the Department's satisfaction that they cannot meet the requirements.

2. A report on attempts to secure financial assurance and responses from financial institutions contacted.

3. Documentation of SCC's attempts, during the reporting quarter, to obtain liability insurance from at a minimum, those insurance carriers identified in writing to the facility by DHS during the quarter. This documentation must include, but need not be limited to:

   a. The names and contact persons of all insurance carriers to which written applications for liability coverage has been made, and copies of all such applications;

   b. The written responses of each insurance carrier regarding whether or not coverage is available, in what types and amount, and at what premiums; and,

   c. Copies of all documents submitted to and received from all insurance carriers contacted.

If at any time DHS determines that SCC is able to comply with the financial liability requirements of Article 17, Title 22, CCR, DHS will notify SCC in writing. Within 30 days of the issuance of such notice SCC must submit to DHS evidence of financial assurance and/or liability coverage pursuant to Article 17, Title 22, CCR.

APPENDICES

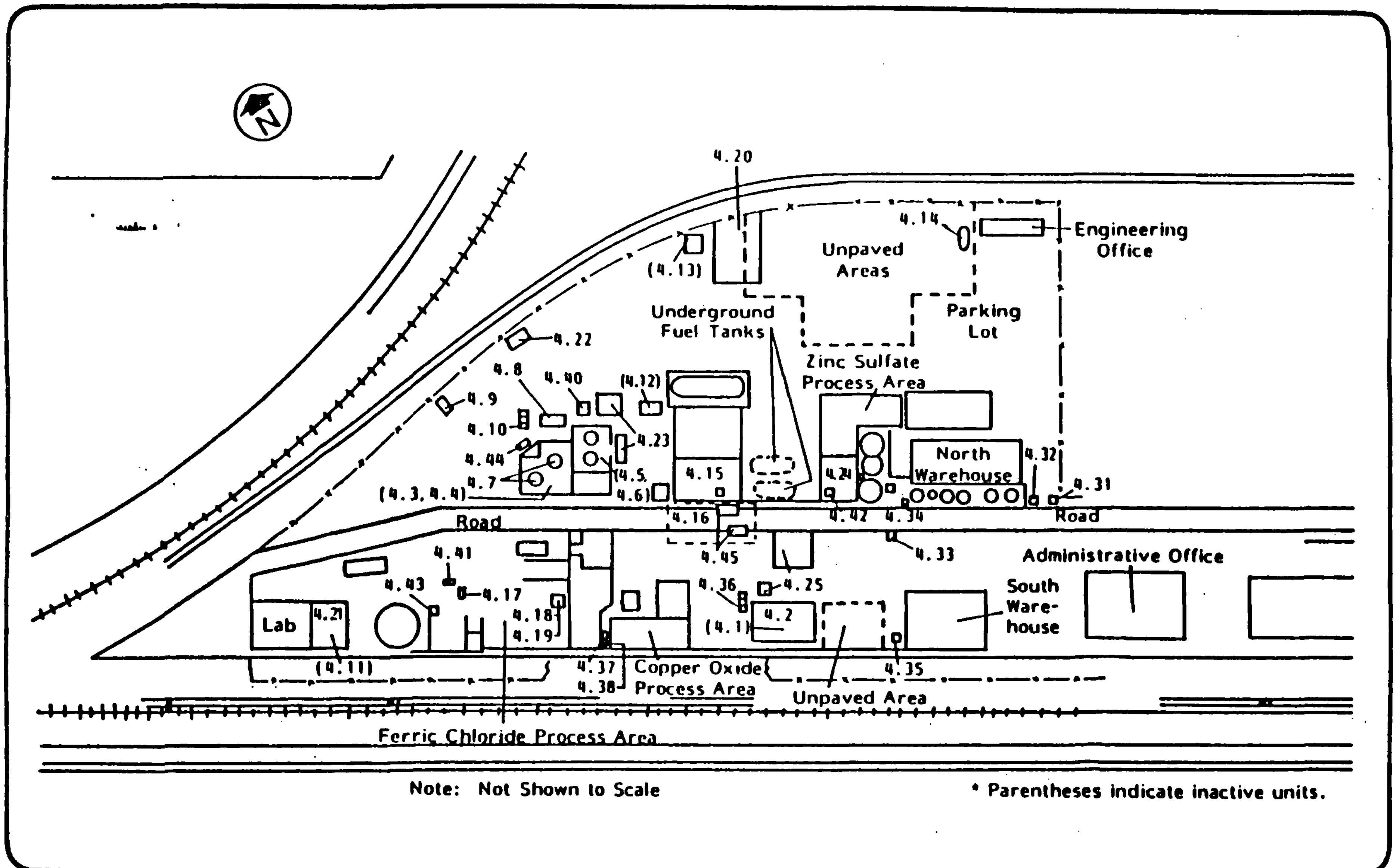
APPENDIX A: FACILITY DIAGRAM

APPENDIX B: GENERIC SITE SAFETY PLAN

APPENDICES

APPENDIX A: FACILITY DIAGRAM

APPENDIX B: GENERIC SITE SAFETY PLAN



APPENDIX A

LOCATION OF SOLID WASTE MANAGEMENT UNITS AT SOUTHERN CALIFORNIA CHEMICAL

Unit 4.1 - Copper Cement Drying Pond No. 7

Unit 4.2 - Rainwater Holding Pond No. 3 (a.k.a. Tank No. 3)

Unit 4.3 - Pond No. 8 (a.k.a. Zinc Pond)

Unit 4.4 - Pond No. 1 (a.k.a. Settling Pond, Tank No. 1) RCRA-regulated

Unit 4.5 - Two 12,000 Gallon Holding Tanks (2 Units)

Unit 4.6 - Pond No. 2 (a.k.a. Tank No. 2)

Unit 4.7 - Wastewater Treatment Tanks W-1 and W-2 (2 Units)

Unit 4.8 - Wastewater Treatment System Filter Press

Unit 4.9 - Former Three Stage Clarifier

Unit 4.10 - New Three Stage Clarifier

Unit 4.11 - Old Wastewater Treatment System (3 Units)

Unit 4.12 - Old Chromic-Sulfuric Underground Storage Tank

Unit 4.13 - 10,000 Gallon Spent Chrome-Sulfuric Acid Tank (a.k.a. SC-1) RCRA-Regulated

Unit 4.14 - Disposal Pit

Unit 4.15 - Drum Wash Area and Sump (2 Units)

Unit 4.16 - Truck Wash Area

Unit 4.17 - Ferric Chloride Area Drum Washing Unit

Unit 4.18 - Ferric Chloride Area Filter Press

Unit 4.19 - Ferric Chloride Area Filter Press Sump (a.k.a. Sump 10)

Unit 4.20 - RCRA-Regulated Drum Storage Area

Unit 4.22 - Drum Storage Area #2

Unit 4.23 - Drum Storage Area #3

Unit 4.24 - Drum Storage Area #4

Unit 4.25 - Drum Storage Area #5

Unit 4.26 - Pre-1975 Sump 2 (Not shown)

Unit 4.27 - Pre-1975 Sump 3 (Not shown)

Unit 4.28 - Pre-1975 Sump 4 (Not shown)

Unit 4.29 - Pre-1975 Sump 6 (Not shown)

Unit 4.30 - Pre-1975 Sump 7 (Not shown)

Unit 4.31 - Sump 1

Unit 4.32 - Sump 2

Unit 4.33 - Sump 3-C

Unit 4.34 - Sumps 3-A and 3-B (2 Units)

Unit 4.35 - Sump 4

Unit 4.36 - Sumps 5-A, 5-B, 5-C (3 Units)

Unit 4.37 - Sump 6-A

Unit 4.38 - Sump 6-B

Unit 4.39 - Sump 7

Unit 4.40 - Sump 8

Unit 4.41 - Sump 9

Unit 4.42 - Sumps 13 and 14 (2 Units)

Unit 4.43 - Sump 16

Unit 4.44 - Wastewater Treatment System Sump

Unit 4.45 - In-Road Sump

Unit 4.46 - Six Vacuum Trucks (6 Units) (Not shown)

Unit 4.47 - Area of Concern: Copper Cement Drying Ponds

Appendix B. Generic Site Safety Plan

This appendix provides a generic plan based on a plan developed by the U.S. Coast Guard for responding to hazardous chemical releases.[1] This generic plan can be adapted for designing a Site Safety Plan for hazardous waste site cleanup operations. It is not all inclusive and should only be used as a guide, not a standard.

A. SITE DESCRIPTION

Date__________ Location__________

Hazards__________

Area affected__________

Surrounding population__________

Topography__________

Weather conditions__________

Additional information__________

B. ENTRY OBJECTIVES - The objective of the initial entry to the contaminated area is to (describes actions, tasks to be accomplished; i.e., identify contaminated soil; monitor conditions, etc.)

C. ONSITE ORGANIZATION AND COORDINATION - The following personnel are designated to carry out the stated job functions on site. (Note: One person may carry out more than one job function.)

PROJECT TEAM LEADER__________

SCIENTIFIC ADVISOR__________

SITE SAFETY OFFICER__________

PUBLIC INFORMATION OFFICER__________

SECURITY OFFICER__________

RECORDKEEPER__________

FINANCIAL OFFICER__________

FIELD TEAM LEADER__________

FIELD TEAM MEMBERS__________

[1] U.S. Coast Guard. Policy Guidance for Response to Hazardous Chemical Releases. USCG Pollution Response COMDTINST-M16465.30.

FEDERAL AGENCY REPS (i.e., EPA, NIOSH) ______________________________

STATE AGENCY REPS ______________________________

LOCAL AGENCY REPS ______________________________

CONTRACTOR(S) ______________________________

All personnel arriving or departing the site should log in and out with the Recordkeeper. All activities on site must be cleared through the Project Team Leader.

D. ONSITE CONTROL

(Name of individual or agency ________ has been designated to coordinate access control and security on site. A safe perimeter has been established at (distance or description of controlled area) ______________________________

No unauthorized person should be within this area.

The onsite Command Post and staging area have been established at ______________________________

The prevailing wind conditions are ______________. This location is upwind from the Exclusion Zone.

Control boundaries have been established, and the Exclusion Zone (the contaminated area), hotline, Contamination Reduction Zone, and Support Zone (clean area) have been identified and designated as follows: (describe boundaries and/or attach map of controlled area) ______________________________

These boundaries are identified by: (marking of zones, i.e., red boundary tape - hotline; traffic cones - Support Zone; etc.) ______________________________

E. HAZARD EVALUATION

The following substance(s) are known or suspected to be on site. The primary hazards of each are identified.

Substances Involved	Concentrations (If Known)	Primary Hazards
(chemical name)		(e.g., toxic on inhalation)

The following additional hazards are expected on site: (i.e., slippery ground, uneven terrain, etc.)

Hazardous substance information form(s) for the involved substance(s) have been completed and are attached.

F. PERSONAL PROTECTIVE EQUIPMENT

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks:

Location	Job Function	Level of Protection
Exclusion Zone	______	A B C D Other
	______	A B C D Other
	______	A B C D Other
	______	A B C D Other
Contamination Reduction Zone	______	A B C D Other
	______	A B C D Other
	______	A B C D Other
	______	A B C D Other

Specific protective equipment for each level of protection is as follows:

Level A
- Fully-encapsulating suit
- SCBA
- (disposable coveralls)

Level B
- Splash gear (type)
- SCBA

Level C
- Splash gear (type)
- Full-face canister resp.

Level D

Other

The following protective clothing materials are required for the involved substances:

Substance	Material
(chemical name)	(material name, e.g., Viton)

If air-purifying respirators are authorized, (filtering medium) is the appropriate canister for use with the involved substances and concentrations. A competent individual has determined that all criteria for using this type of respiratory protection have been met.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SITE SAFETY OFFICER AND THE PROJECT TEAM LEADER.

G. ONSITE WORK PLANS

Work party(s) consisting of ____ persons will perform the following tasks:

Project Team Leader ____(name)____ ________(function)________

Work Party #1 ______________ ______________

Work Party #2 ______________ ______________

Rescue Team (required for entries to IDLH environments) ______________ ______________

Decontamination Team ______________ ______________

The work party(s) were briefed on the contents of this plan at ______________.

H. COMMUNICATION PROCEDURES

Channel ____ has been designated as the radio frequency for personnel in the Exclusion Zone. All other onsite communications will use channel ____.

Personnel in the Exclusion Zone should remain in constant radio communication or within sight of the Project Team Leader. Any failure of radio communication requires an evaluation of whether personnel should leave the Exclusion Zone.

(Horn blast, siren, etc.) is the emergency signal to indicate that all personnel should leave the Exclusion Zone. In addition, a loud hailer is available if required.

The following standard hand signals will be used in case of failure of radio communications:

Hand gripping throat --------------- Out of air, can't breathe
Grip partner's wrist or ------------ Leave area immediately
both hands around waist
Hands on top of head --------------- Need assistance
Thumbs up -------------------------- OK, I am all right, I understand
Thumbs down ------------------------ No, negative

Telephone communication to the Command Post should be established as soon as practicable. The phone number is ____________.

I. DECONTAMINATION PROCEDURES

Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated. The standard level ____ decontamination protocol shall be used with the following decontamination stations: (1) ____________
(2) ____________ (3) ____________ (4) ____________ (5) ____________
(6) ____________ (7) ____________ (8) ____________ (9) ____________
(10) ____________ Other ____________

Emergency decontamination will include the following stations: ____________

The following decontamination equipment is required: ____________

(Normally detergent and water) will be used as the decontamination solution.

J. SITE SAFETY AND HEALTH PLAN

1. (name) is the designated Site Safety Officer and is directly responsible to the Project Team Leader for safety recommendations on site.

2. Emergency Medical Care

(names of qualified personnel) ______ are the qualified EMTs on site. (medical facility names) ______, at (address) ______, phone ______ is located ______ minutes from this location. (name of person) ______ was contacted at (time) ______ and briefed on the situation, the potential hazards, and the substances involved. A map of alternative routes to this facility is available at (normally Command Post) ______.

Local ambulance service is available from ______ at phone ______. Their response time is ______ minutes. Whenever possible, arrangements should be made for onsite standby.

First-aid equipment is available on site at the following locations:

First-aid kit ______
Emergency eye wash ______
Emergency shower ______
(other) ______ ______

Emergency medical information for substances present:

Substance	Exposure Symptoms	First-Aid Instructions

List of emergency phone numbers:

Agency/Facility	Phone #	Contact
Police		
Fire		
Hospital		
Airport		
Public Health Advisor		

3. Environmental Monitoring

The following environmental monitoring instruments shall be used on site (cross out if not applicable) at the specified intervals.

Combustible Gas Indicator - continuous/hourly/daily/other ______
O_2 Monitor - continuous/hourly/daily/other ______
Colorimetric Tubes - continuous/hourly/daily/other ______
(type) ______ ______
______ ______
______ ______
HNU/OVA - continuous/hourly/daily/other ______
Other ______ - continuous/hourly/daily/other ______
- continuous/hourly/daily/other ______

4. Emergency Procedures (should be modified as required for incident)

The following standard emergency procedures will be used by onsite personnel. The Site Safety Officer shall be notified of any onsite emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury in the Exclusion Zone: Upon notification of an injury in the Exclusion Zone, the designated emergency signal ________________ shall be sounded. All site personnel shall assemble at the decontamination line. The rescue team will enter the Exclusion Zone (if required) to remove the injured person to the hotline. The Site Safety Officer and Project Team Leader should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the Support Zone. The onsite EMT shall initiate the appropriate first aid, and contact should be made for an ambulance and with the designated medical facility (if required). No persons shall reenter the Exclusion Zone until the cause of the injury or symptoms is determined.

Personnel Injury in the Support Zone: Upon notification of an injury in the Support Zone, the Project Team Leader and Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the onsite EMT initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, the designated emergency signal ________________ shall be sounded and all site personnel shall move to the decontamination line for further instructions. Activities on site will stop until the added risk is removed or minimized.

Fire/Explosion: Upon notification of a fire or explosion on site, the designated emergency signal ________________ shall be sounded and all site personnel assembled at the decontamination line. The fire department shall be alerted and all personnel moved to a safe distance from the involved area.

Personal Protective Equipment Failure: If any site worker experiences a failure or alteration of protective equipment that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Reentry shall not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure: If any other equipment on site fails to operate properly, the Project Team Leader and Site Safety Officer shall be notified and then determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions taken.

The following emergency escape routes are designated for use in those situations where egress from the Exclusion Zone cannot occur through the decontamination line: (describe alternate routes to leave area in emergencies)

In all situations, when an onsite emergency results in evacuation of the Exclusion Zone, personnel shall not reenter until:

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been reassessed.
3. The Site Safety Plan has been reviewed.
4. Site personnel have been briefed on any changes in the Site Safety Plan.

5. Personal Monitoring

The following personal monitoring will be in effect on site:

Personal exposure sampling: (describe any personal sampling programs being carried out on site personnel. This would include use of sampling pumps, air monitors, etc.)

Medical monitoring: The expected air temperature will be (°F) . If it is determined that heat stress monitoring is required (mandatory if over 70°F) the following procedures shall be followed: (describe procedures in effect, i.e., monitoring body temperature, body weight, pulse rate)

All site personnel have read the above plan and are familiar with its provisions.

Site Safety Oficer	(name)	(signature)
Project Team Leader		
Other Site Personnel		